

Unit 1

Force and Motion

Lesson 1 Types of levers

Objectives:

- Determining what is meant by a lever and its importance.
- Listing examples explaining types of levers.
- Identifying some applications of levers in the daily life.

Lesson 2 Law of levers

Objectives:

- Conducting practical experiments to deduce the law of levers.
- Applying some examples on the law of levers.

Summary

The first simple machine man invented in the past is known as a lever.

Lever

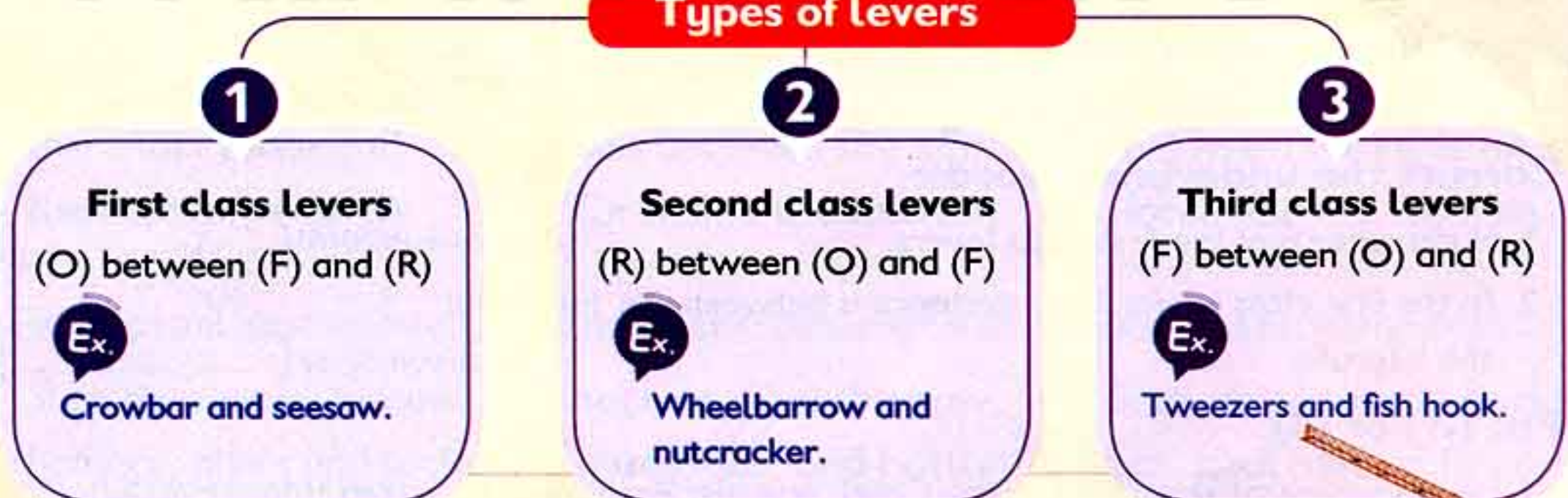
- It's the rigid bar that rotates around a fixed point called "fulcrum" and it's affected by effort force and resistance force.
- Any lever consists of:

- 1 Fulcrum** The fixed point which the bar rotates around.
- 2 Effort force** The force exerted by a person to overcome the resistance.
- 3 Resistance force** The force resulting from the weight of the object we want to move.

Levers help man to perform tasks easily by means of:

- 1 Increasing force (crowbar).
- 2 Increasing speed (hockey bat).
- 3 Increasing distance (manual broom).
- 4 Avoiding dangers (coal holder).
- 5 Preserving accuracy in performance (tweezers).
- 6 Moving force from one place to another (manual broom).

Types of levers



- The most common type of levers in our daily life is the 1st class lever.
- The first scientist who described the lever was Archimedes.

GEM

Exercises on Lesson

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Answer Guide P. 2

1 Choose the correct answer:

- Levers rotate around a fixed point called (Cairo 2019)
a. resistance force b. fulcrum c. effort force d. rigid bar
- The force that is exerted to equilibrate the resistance is called
a. fulcrum b. effort c. friction d. (a) and (b)
- The first simple machines man invented to lift heavy objects were called (Menofia 2016)
a. levers b. bike c. planes d. (a) and (b)
- The function of a lever is to increase (Cairo 2019)
a. force b. distance
c. speed d. all the previous answers
- All levers and machines
a. are made of the same substances b. are similar in shape and size
c. don't have a specific function d. have a fixed point called "fulcrum"
- 🏰 All of the following are among functions of levers except (Luxor 2016)
a. increasing speed b. increasing force
c. increasing size d. accuracy in performance
- is/are used to pick up very small objects.
a. Coal holder b. Tweezers c. Manual broom d. Seesaw
- Which of the following levers is used to transfer force from one place to another? -
a. Manual broom b. Nutcracker c. Scissors d. Stapler
- Crowbar is considered a lever from type. (Cairo 2016)
a. first b. second c. third d. (a) and (b)
- increase the speed of the object that we inflict on. (Alex. 2011)
a. Nutcrackers b. Coal holders c. Wheelbarrows d. Hockey bats
- Which of the following levers is used to avoid dangers? - (Menofia 2012)
a. Coal holder b. Scissors c. Seesaw d. Manual broom

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12. The lever that has the fulcrum between the force and the resistance is
(Fayoum 2019)
a. first b. second c. third d. first and second
13.  is one of the first class levers. (Cairo 2019)
a. Nutcracker b. Sweet holder c. Scissors d. Manual broom
14.  The 1st class lever differs from the 2nd class lever in (Alex. 2013)
a. the absence of the effort force b. the presence of a fixed point
c. the position of the fulcrum d. (a) and (b)
15. Seesaw is a first class lever because
a. the effort force lies between the resistance force and the fulcrum
b. the resistance force lies between the effort force and the fulcrum
c. the fulcrum lies between the effort force and the resistance force
d. there is no correct answer
16. All the following are second class levers except (Beheira 2017)
a. wheelbarrow b. sweet holder c. bottle opener d. nutcracker
17.  Which one of the following is a second class lever? – (South Sinai 2016)
a. Sweet holder b. Wheelbarrow c. Seesaw d. Hockey bat
18. is/are an example of the third class levers. (Kafr El- Skeikh 2019)
a. Scissors b. Sweet holder c. Seesaw d. Nutcracker
19. Which of the following levers has the force between resistance and fulcrum? – (Giza 2019)
a. Scissors b. Nutcracker c. Sweet holder d. Seesaw
20.  All the following are third class levers except (Fayoum 2017)
a. wheelbarrow b. fishing tool c. sweet holder d. manual broom
21. Sweet holder is a class lever.
a. first b. second c. third d. no correct answers
22. have the effort force between the resistance force and the fulcrum. (Menofia 2013)
a. 3rd class levers b. 2nd class levers
c. 4th class levers d. (b) and (c)
23. have the resistance force between the effort force and the fulcrum. (Cairo 2017)
a. Third class levers b. First class levers
c. Second class levers d. (a), (b) and (c)

24.  Which of the following is a 2nd class lever? -
 a. Manual broom b. Tweezers c. Scissors d. Bottle opener
25.  is/are a lever of the 3rd class.
 a. Sweet holder b. Scissors c. Nutcracker d. Nail clipper
26.  The effort force is between the resistance force and the fulcrum in
 (Fayoum 2013)
 a. nutcracker b. scissors c. sweet holder d. crowbar
27. All the following are of the 1st class levers except
 a. wheelbarrow b. scissors c. seesaw d. suction pump

2 Complete the following sentences:

- Simple machines that help man to perform heavy tasks more easily are called
-  is considered one of the first simple machines which was invented in the past.
- The lever is a rigid bar that rotates around a fixed point called and is also affected by and (Suez 2012)
-  The lever is a that rotates around a fixed point called the fulcrum. (Suez 2013)
- The scientist is the first who invented levers to facilitate tasks. (Port Said 2018)
- Among the factors that make levers important are and
- Some levers allow increasing the speed of objects we inflict on as in (Menofia 2017)
- Crowbar saves effort by using force to move big
- The consists of, fulcrum and
- In the first class levers, the lies between and (Aswan 2016)
- Among the types of levers are and
- Manual broom is an example of lever that is used to increase, while hockey bat is an example of lever that is used to increase the (Assiut 2016)
- In the third class levers, the lies between and
- that are very accurate are used to fix watches.
-  In the first class levers, the fulcrum is found between and (Sohag 2017)
- is the most popular type of levers in our daily life.
- From the examples of levers that are used to avoid dangers is (Gharbia 2017)
-  The nutcracker is an example of the levers. (Port Said 2019)

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19. Seesaw is, while sweet holder is (Sohag 2015)
20. The scissors are considered a class lever, while a manual broom is a class lever. (Cairo 2019)
21. 🍰 In the second class levers, the resistance force is found between and
22. The crowbar is a class lever, while is a third class lever. (Red Sea 2012)
23. In class lever, the effort force is found between the fulcrum and the resistance force.

3 Put (✓) in front of the right statement and (X) in front of the wrong one:

1. Levers were first described by the Greek scientist Archimedes. (Kaf El-Sheikh 2012) ()
2. From the functions of levers is to decrease speed. (Cairo 2017) ()
3. Manual broom is used in increasing distance and transferring force. ()
4. 🍰 In the first class levers, the resistance force is between the effort force and the fulcrum. (Fayoum 2012) ()
5. Nutcracker is a second class lever because the effort force lies between the resistance force and the fulcrum. ()
6. Fish hook is a first class lever. (Ismailia 2017) ()
7. Wheelbarrow, sweet holder and fishing tool are of the third class levers. ()
8. 🍰 In the second class levers, the resistance force lies between the effort force and the fulcrum. (Ismailia 2017) ()
9. 🍰 The fulcrum of any lever is always between the effort force and the resistance force. (Qena 2016) ()
10. 🍰 The fulcrum in scissors lies between the effort force and the resistance force. (Assuit 2019) ()
11. 🍰 Nutcracker is considered a first class lever. (Matrouh 2013) ()
12. Wheelbarrow is an example of the first class levers. (Sohag 2019) ()
13. Levers make tasks easier. (Assiut 2012) ()
14. Scissors are of the third class levers. ()
15. 🍰 Crowbar is a first class lever. (Sohag 2014) ()
16. Coal holder is used to avoid dangers. (Dakahlia 2019) ()

17. In order to determine the type of the lever, you have to determine the location of each of the effort force and the resistance force with respect to the fulcrum. ()
18. 🍰 The third class levers have the fulcrum between the effort force and the resistance force. (Cairo 2012) ()
19. Soda water opener is a second class lever, while fishing tool is a first class lever. (Cairo 2019) ()


4 Write the scientific term for each of the following:

- The first scientist who describes the levers in 260 BC. (Giza 2018) (.....)
- A rigid bar rotates on a fixed point, and is affected by a force resistance. (Port Said 2019) (.....)
- The fixed point on which the lever rotates. (Giza 2019) (.....)
- A lever used in increasing the force. (.....)
- A lever used in increasing the distance and transferring the force. (.....)
- A lever used in increasing the speed. (.....)
- A lever used to avoid the dangers and the heat. (.....)
- A force that results from the body that we want to move. (.....)
- A force that is exerted by a person to equilibrate the resistance force. (.....)
- The most popular type of levers in our daily life. (.....)
- Levers where the fulcrum lies between the effort force and the resistance force. (.....)
- Levers in which the resistance force lies between the effort force and the fulcrum. (Cairo 2019) (.....)
- Levers that have the force between the resistance and the fixed point. (Cairo 2019) (.....)

5 Correct the underlined words:

- Newton was the first scientist who describes the levers. (Cairo 2019) (.....)
- The human arm is from the third class levers. (Fayoum 2017) (.....)
- A lever must have effort force, resistance force and a heavy load. (.....)
- Resistance force lies between the effort force and the fulcrum in the third class lever. (.....)

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5. The coal holder is used in increasing force. (.....)
6. Seesaw, scissors and bottle opener are examples of the first class levers. (Ismailia 2011) (.....)
7. Wheelbarrow is a third class lever. (Beni Suef 2012) (.....)
8. Manual broom works on increasing force. (.....)
9. The fulcrum lies between the effort force and the resistance force in the third class levers. (Suez 2012) (.....)
10. Bottle opener is a third class lever. (.....)
11. In the first class levers, the resistance force lies between the effort force and the fulcrum. (Damietta 2011) (.....)
12. Third class levers are the most popular type in our daily life. (.....)
13. Scissors and bottle openers are examples of the third class levers. (.....)
14. In the second class levers, the effort force lies between the fulcrum and the resistance force. (Beni Suef 2012) (.....)
15.  Nutcracker is of the first class levers. (Alex. 2017) (.....)
16. Some of the levers allow the increase in the speed of objects we inflict on as in manual broom. (Alex. 2012) (.....)

6 Match the sentences in column (A) with the correct sentences in column (B): (Minia 2014)

1.	(A)	(B)
1.	Seesaw	a. the fulcrum
2.	Fishing tool	b. a first class lever
3.	The fixed point on which a rigid bar rotates	c. the resistance
4.	Nutcracker	d. a lever
5.	A rigid bar that rotates around a fixed point called (fulcrum) and is also affected by the effort force and the resistance force	e. a second class lever
		f. a third class lever


1. 2. 3. 4. 5.

2.

(A)	(B)
1. First class levers	a. Fishing tool, manual broom and tweezers.
2. Second class levers	b. It is the most famous kind of levers.
3. Third class levers	c. Wheelbarrow, bottle opener and nutcracker.
4. The levers	d. It is a fixed point that a rigid bar rotates on.
5. The effort force	e. It is a rigid bar that rotates around a fixed point and is affected by a force and a resistance.
6. The resistance force	f. It lies in the middle in the third class levers.
7. The fulcrum	g. It lies in the middle in the second class levers.

1. 2. 3. 4.
5. 6. 7.

7 Give a reason for each of the following:

- Crowbar is a lever. (Alex. 2019)
.....
- Seesaw is a first class lever.
.....
- Sweet holder is a third class lever.
.....
-  Levers have great importance in our life. (Assuit 2011)
.....
- Wheelbarrow is a second class lever.
.....
- Doctors and watchmakers use tweezers as a lever.
.....
- Nutcracker is considered an increasing force lever.
.....
- Manual broom is considered an increasing distance lever.
.....
- Bottle opener and stapler are of second class levers. (Giza 2018)
.....

(27)

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8 Define each of the following:

1. Fulcrum.

(Alex. 2012)

2. Lever.

(Damietta 2017)

3. First class levers.

4. Second class levers.

5. Third class levers.

9 Mention one function for each of the following:

1. Levers.

(Sohag 2017)

2. Coal holder.

3. Wheelbarrow.

4. Crowbar.

5. Manual broom.

6. Hockey bat.

(Sharkia 2017)

10 Circle the odd word and then express the other words using a scientific term:

1. Seesaw - crowbar - scissors - nutcracker.

2. Wheelbarrow - nutcracker - pliers - bottle opener.

3. Hockey bat - coal holder - fish hook - crowbar.

11 Mention four functions of the levers.

(Beheira 2018)

.....

.....

12 Mention one example of a lever used in:

1. avoiding dangers.

.....

2. transferring force from one place to another.

.....

3. catching things accurately.

.....

4. increasing speed.

.....

5. saving effort.

.....

6. increasing force.

.....

7. increasing distance.

.....

13 🍰 Classify the following machines according to the type of lever: (Assuit 2017)



(1)



(2)



(3)



(4)



(5)



(6)

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14 🍰 The maze of levers:

Mona is trying to pass through the levers to reach the ice cream at the end of the maze. But, she has to pass only through the squares that have first class levers, mention the way that she must pass through.



15 🍰 Compare between the three types of levers according to the location of fulcrum, resistance force and effort force giving examples for each type.

(Giza 2013)

First class levers	Second class levers	Third class levers
.....
.....

16 🍰 What would happen if we didn't have levers?

.....

.....

.....

TIMSS

Like Questions

on Lesson

Answer Guide P. 3

1. Examine the following figure:

Mohamed is trying to move a large stone in the garden of his house.

He used a rigid bar as shown.

a. The straight rigid bar he used is called

a

b. He used the rigid bar for a certain benefit which is

c. In the figure:

1. Determine the position of the fulcrum (O).

2. Determine the position of the effort force (F).

3. Determine the position of the resistance force (R).

d. What is the type of the lever he used? Explain your answer.

.....

2. Some students have ideas about properties of types of levers:

Shaimaa



Lever that have the fulcrum (O) between the effort force (F) and the resistance force (R).

Doaa



Lever that have the effort force (F) between the resistance force (R) and the fulcrum (O).

Mariam



Such as: seesaw, suction pump, crowbar and balance.

a. Which students are talking about the first class levers?

.....

b. Which students are talking about the second class levers?


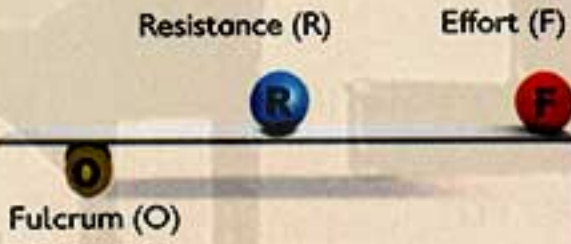

.....

Summary

Law of levers states that:

$$\text{Effort force} \times \text{its arm} = \text{resistance force} \times \text{its arm}$$

- ▶ **Force arm:** The distance between effort force and fulcrum.
- ▶ **Resistance arm:** The distance between resistance force and fulcrum.
- ▶ Effort force and resistance force are measured in **(Newton)**.
- ▶ Effort arm and resistance arm are measured in **(cm) or (meter)**.

P.O.C	First class levers	Second class levers	Third class levers
Locations of F, O, R:	 <ul style="list-style-type: none"> The fulcrum (O) is located between the effort force (F) and the resistance force (R). 	 <ul style="list-style-type: none"> The resistance force (R) is located between the fulcrum (O) and the effort force (F). 	 <ul style="list-style-type: none"> The effort force (F) is located between the resistance force (R) and the fulcrum (O).
Saving effort	<ul style="list-style-type: none"> Some of them save effort, but others do not save effort. 	<ul style="list-style-type: none"> They always save effort. 	<ul style="list-style-type: none"> They do not always save effort.
Examples	<ul style="list-style-type: none"> Crowbar, pliers, pincers and scissors. 	<ul style="list-style-type: none"> Bottle opener, wheelbarrow and nutcracker. 	<ul style="list-style-type: none"> Ice holder, fishing tool and manual broom.

▶ All the third class levers and some of the first class levers have no mechanical benefits but they have other benefits such as:

- Increasing speed.
- Increasing distance.
- Avoiding dangers.
- Providing the accuracy of performance.

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Exercises on Lesson

2

Answer Guide P. 4

1 Choose the correct answer:

- The factors that determine the values of the effort force and the resistance force in a lever are
 - the arm of the force
 - the arm of the resistance
 - the position of the fulcrum
 - (a) and (b)
- The law of levers states that (Cairo 2014)
 - Effort force + its arm = resistance force + its arm
 - Effort force \times its arm = resistance force \div its arm
 - Effort force \times its arm = resistance force \times its arm
 - Effort force - its arm = resistance force \times its arm
- When the arm of force is longer than the arm of resistance, the effort force is the resistance force.
 - larger than
 - smaller than
 - double
 - equal to
- The effort force and the resistance force are measured in
 - Newton
 - Hertz
 - meter
 - cubic centimeter
- The distance between the effort force and the fulcrum is called
 - the arm of the force
 - the arm of resistance
 - the arm of the lever
 - the fulcrum
- The distance between the resistance force and the fulcrum is called
 - the arm of resistance
 - the arm of force
 - the arm of the lever
 - the fulcrum
- The lever saves effort when (Gharbia 2017)
 - the arm of force is less than the arm of resistance
 - the arm of force is equal to the arm of resistance
 - resistance equals force
 - the arm of force is longer than the arm of resistance
- If an effort force of value 10 Newton at 10 cm distance from a fulcrum of a lever inflicts an amount of resistance at 5 cm from the fulcrum of the lever, then the resistance force will be
 - 10 Newton
 - 20 Newton
 - 5 Newton
 - 100 Newton



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9. An effort force of value 100 Newton is at one end of a lever and the arm of force = 10 cm if it is affected by a resistance of 20 Newton, then the arm of resistance will be
 a. 20 cm b. 10 cm c. 50 cm d. 100 cm
10. An effort force of 10 Newton at a distance of 10 cm from the fulcrum. If you place a resistance force of 20 Newton on the other end of the lever, then the length of the arm of resistance is
 a. 20 cm b. 10 cm c. 5 cm d. 25
11. 🍰 Which of the following levers saves (conserves) effort? – (Giza 2019)
 a. Scissors b. Nutcracker c. Fishing rod d. Sweet holder
12. 🍰 The force arm is sometimes equal to the resistance arm in the class levers. (Port Said 2019)
 a. first b. second c. third d. first and third
13. Which of the following levers doesn't save effort? – (Giza 2019)
 a. Fishing tool b. Nutcracker c. Bottle opener d. Wheelbarrow
14. Second class levers always save effort because the length of the arm force is the length of the arm of resistance.
 a. equal to b. longer than c. shorter than d. no correct answers
15. The type of levers which always has a mechanical benefit is the
 a. 1st class levers b. 2nd class levers c. 3rd class levers d. no correct answers
16. The type of lever which always doesn't save effort is the (Sharkia 2014)
 a. first class lever b. third class lever
 c. second class lever d. fourth class lever
17. 🍰 When the lever is balanced,
 a. effort force/arm of resistance = resistance force/arm of force
 b. effort force/arm of force = resistance force × arm of resistance
 c. effort force × arm of force = resistance force × arm of resistance
 d. effort force × arm of resistance = resistance force × arm of force

2 Complete the following sentences:

1. is the measuring unit of effort force, but is the measuring unit of its arm. (Qalubia 2018)
2. 🍰 The effort force × its arm = × (Cairo 2019)
3. The distance between the force and the fulcrum is known as where the distance between the fulcrum and the resistance is called (Port Said 2017)
4. The force arm is the distance between and





Unit 1

5. The factors that determine the values of effort force and resistance effort force are and
6.  If the arm of force is shorter than the arm of resistance, then the effort force is than resistance force. (Sohag 2014)
7. If the arm of resistance is shorter than the arm of force, then the resistance force is than the effort force.
8. Effort force is measured in unit.
9. Resistance arm is measured in unit.
10. First class levers save effort and the value of resistance force is than the value of the effort force.
11. When the arm of force is equal to the arm of resistance, then is equal to
12. If the ratio between the length of the arm of force and the length of the arm of resistance equals 10:1, then the ratio between effort force and resistance force =
13. When the resistance force equals 10 N, the resistance arm = 5 cm and the force arm = 2 cm, then the effort force equals
14. The lever conserves effort when is longer than arm. (Damietta 2017)
15. The lever doesn't conserve effort when arm is shorter than arm.
16.  The only type of the levers where the arm of force and the arm of resistance are equal is (Assuit 2019)
17. Some levers allow the conservation of by means of using small force to move heavy loads, like the crowbar. (Alex. 2011)
18. If the arm of force is shorter than the arm of resistance, then the is larger than (Sharkia 2017)
19. class levers always save effort, while class levers never save effort.
20. The second class levers always save effort because the is longer than the (Sharkia 2014)
21. In hockey bat, the effort force arm is than the resistance force, while in soda water bottle opener, the effort force arm is than the resistance arm.
22. The first class levers have mechanical benefit when is longer than
23. Tweezers and coal holder have no mechanical benefits, because is shorter than
24. When the lengths of the resistance arm and the effort arm equal 5 cm and the resistance = 2 Newton, then the effort force equals
25. Manual broom doesn't save effort because


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26. Bottle opener has a mechanical benefit because is longer than
27. When the effort force equals 40 Newton, resistance force is 20 Newton and effort force arm = 8 cm, then the resistance arm equals

3 Put (✓) in front of the right statement and (X) in front of the wrong one, then correct it:

1. The law of levers states that effort force x its arm = resistance force x its arm. ()
2. The effort force is measured in kilogram. ()
3.  The effort force x its arm = the resistance force x its arm. (Suez 2014) ()
4.  When the resistance arm is longer than the effort arm, then the lever saves effort. (Giza 2013) ()
5. Resistance arm is measured in centimeter. ()
6. Force arm is the distance between the effort force and the fulcrum. ()
7. When the force arm is longer than the resistance arm, then the lever has a mechanical benefit. ()
8. When the effort force equals the resistance force, then the force arm is shorter than the resistance arm. ()
9. When the value of the resistance force = 100 N, the effort force = 200 N and the force arm = 10 cm, then the resistance arm = 10 cm. ()
10. Soda water bottle opener always conserves effort, while coal holder doesn't conserve effort. ()
11. The lever saves effort if the arm of force is shorter than the arm of resistance. ()
12. If the arm of force is shorter than the arm of resistance, then the effort force is less than the resistance force. (Dakahlia 2019) ()
13. In the first class levers, there are three possibilities for the length of each of the arm of force and the arm of resistance. ()
14. The second class levers are the type of levers where effort force is equal to resistance. ()
15.  If the arm of the force is shorter than the arm of the resistance, then the lever conserves the effort. (Sohag 2019) ()
16. Seesaw doesn't have a mechanical benefit because the force arm is longer than the resistance arm. ()
17. Manual broom doesn't conserve effort. ()
18. The second class levers always save effort. ()
19.  The third class levers always save effort. (Qalubia 2014) ()
20. In the 3rd class levers, the arm of force may be equal to the arm of resistance. (Dakahlia 2014) ()

4 Write the scientific term for each of the following:

1. The distance between the effort force and the fulcrum. (Cairo 2016) (.....)
2. The distance between the resistance force and the fulcrum. (Beheira 2019) (.....)
3. The product of force multiplied by its arm equals the product of resistance multiplied by its arm. (.....)
4. It's the measuring unit of resistance and force effort. (Dakahlia 2019) (.....)
5. The type of levers that always save effort. (Sohag 2019) (.....)
6. The type of levers that never save effort. (.....)
7. The type of levers that sometimes save effort. (Cairo 2019) (.....)
8. The lever which is used to carry out the job accurately. (.....)
9.  Effort force x its arm = resistance force x its arm. (.....)
10. The type of levers, where the effort force is always smaller than the resistance force. (.....)
11. The type of levers, where the effort force is always larger than the resistance force. (.....)

5 Correct the underlined words:

1. The first class levers save effort if the effort force is equal to the resistance. (.....)
2. The first class levers always save effort. (Gharbia 2016) (.....)
3. The second class levers don't save effort. (Cairo 2019) (.....)
4. Coal holder is an effort-saving lever. (.....)
5. The arm of force is always longer than the arm of resistance in the first class levers. (.....)
6. The distance between the effort force and the fulcrum is called the arm resistance. (.....)
7. The first class levers never save effort. (.....)
8. The arm of the resistance is the distance between the resistance and force. (.....)
9. When the arm of force equals the arm of resistance, then the effort force is larger than the resistance force. (.....)

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10. Although crowbar is a third class lever, it conserves effort.

(Gharbia 2017) (.....)


11. The third class levers always save effort.

(Gharbia 2016) (.....)

12. The first class levers always have no mechanical benefits. (Minia 2014) (.....)

13. If the force arm is smaller than the resistance arm, the lever saves effort.

(Port Said 2019) (.....)

6  Match the sentences in column (A) with the correct sentences in column (B):
(Port Said 2019)


(A)	(B)
1. The first class levers	a. levers that always save effort.
2. The second class levers	b. levers that never save effort.
3. The third class levers	c. levers that sometimes save effort.
4. The lever	d. is a fixed point on which the rigid bar rotates.
5. The fulcrum	e. is a rigid bar that moves around a fixed point and is affected by effort force and resistance force.

1. 2. 3. 4. 5.


7 Give a reason for each of the following:

1. Crowbar conserves effort.


.....

2.  The effort force doesn't equal the resistance force in the 2nd class levers. (Luxor 2014)

.....

3.  Sometimes the 1st class levers save effort.

.....

4.  In the second class levers, the effort force is always less than the resistance force.

.....

5. Second class levers always conserve the effort. (Kafr El-Sheikh 2019)

.....

6. The 3rd class levers are very important although they don't conserve effort.

(Damietta 2019)

.....

8 What happens when ...?

1. The arm of force is longer than the arm of resistance. (Menofia 2017)
2. The arm of force is shorter than the arm of resistance. (Giza 2019)
3. The arm of force is equal to the arm of resistance. (Alex. 2019)
4. The length of the effort arm is half the length of the resistance arm for a lever. (Damietta 2017)
5. The effort force is larger than the resistance force. (Dakahlia 2014)

9 Define each of the following:

1. The arm of force.
2. The arm of resistance.
3. The law of levers.

10 From the shown table, find:

Force (Newton)	Arm of force (cm)	Resistance (Newton)	Arm of resistance (cm)
X	5	1	10
5	8	2	Y
50	10	Z	10
100	N	25	8

- a. The value of (X)
- b. The value of (Y)
- c. The value of (Z)
- d. The value of (N)

Lesson 2

11 Compare between the three types of levers using the following table:

P.O.C	First class levers	Second class levers	Third class levers
Definition
Importance
Conservation of effort
Examples

12 Complete the following:

Law of levers

States that

$$\text{Effort force} \times \dots = \dots \times \dots$$

Determining the mechanical purposes of levers

First class levers

The fulcrum lies between the force of effort and the force of resistance.



Second class levers

.....

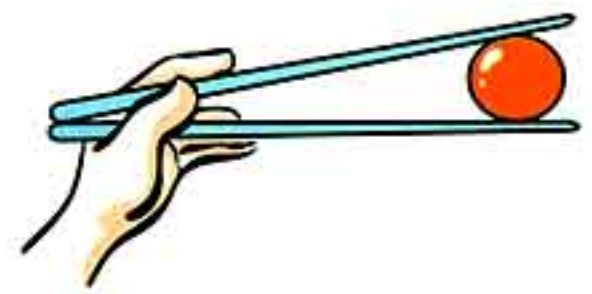
.....



Third class levers

.....

.....



.....

always conserve effort.

.....

13 Problems:

1. A second class lever has an effort force of 200 Newton and the length of its force arm is 50 cm, **calculate** the length of the arm of resistance, if it is affected by a resistance force of 100 Newton.

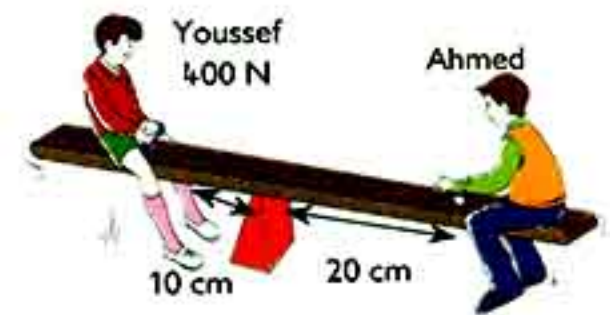
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.....

2. In the opposite figure, the lever is balanced.
Calculate Ahmed's weight.

.....

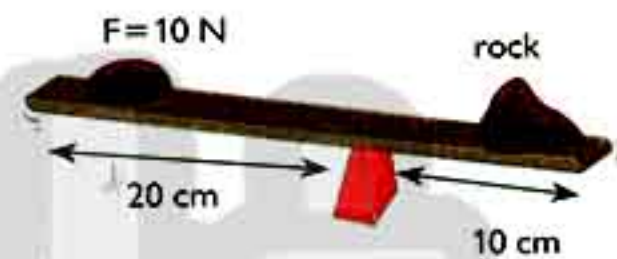
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3.  In the opposite figure, **calculate** the weight of the rock when the lever is balanced.
Is this lever effort-saving? Why?

.....

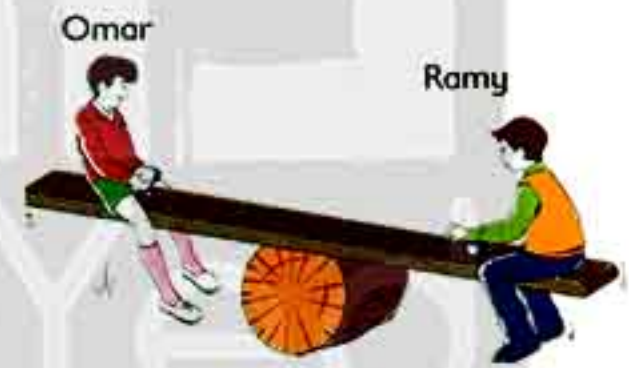
.....



4. The opposite figure illustrates a balanced lever.
Omar's distance from the fulcrum is double Ramy's distance from the same fulcrum.
Which weight is heavier, Omar's or Ramy's? Why?

.....

.....



5. In the opposite figure, a ruler of length 30 cm. A cylinder rubber was placed at the middle of the ruler, then a coin was placed at the mark zero:

- a. Where should you put another coin so that the ruler is balanced?
-
- b. What is the number of coins that should be placed at the mark 20 so that the ruler is balanced?
-



6. **Calculate** the length of the arm of force in a lever whose force value equals 400 N and the resistance value is 200 N; if you know that the arm of resistance equals 20 cm.
Does this lever conserve effort or not? Why?

(Matrouh 2016)


.....


.....

Lesson 2

7. A balanced lever has a resistance force of 40 Newton. The distance between the resistance force and the fulcrum is 4 cm. Calculate the value of the effort force that should be placed at the other end 10 cm away from the fulcrum. (Luxor 2016)

8. Calculate the length of the force arm in a lever if you know that the value of the force is 100 N, the resistance is 200 N and the length of the resistance is arm 20 cm. (Aswan 2016)

9.  The force affecting a second class lever equals 200 Newton and the length of its arm is 50 cm and has a resistance force of 1000 Newton. Calculate the length of the arm of the resistance. (Port Said 2014)


10.  The length of the force arm of a first class lever is 5 cm, and the length of the arm of the resistance is 15 cm. If the value of the resistance force is 300 Newton, then calculate the value of the effort force. (Qena 2016)

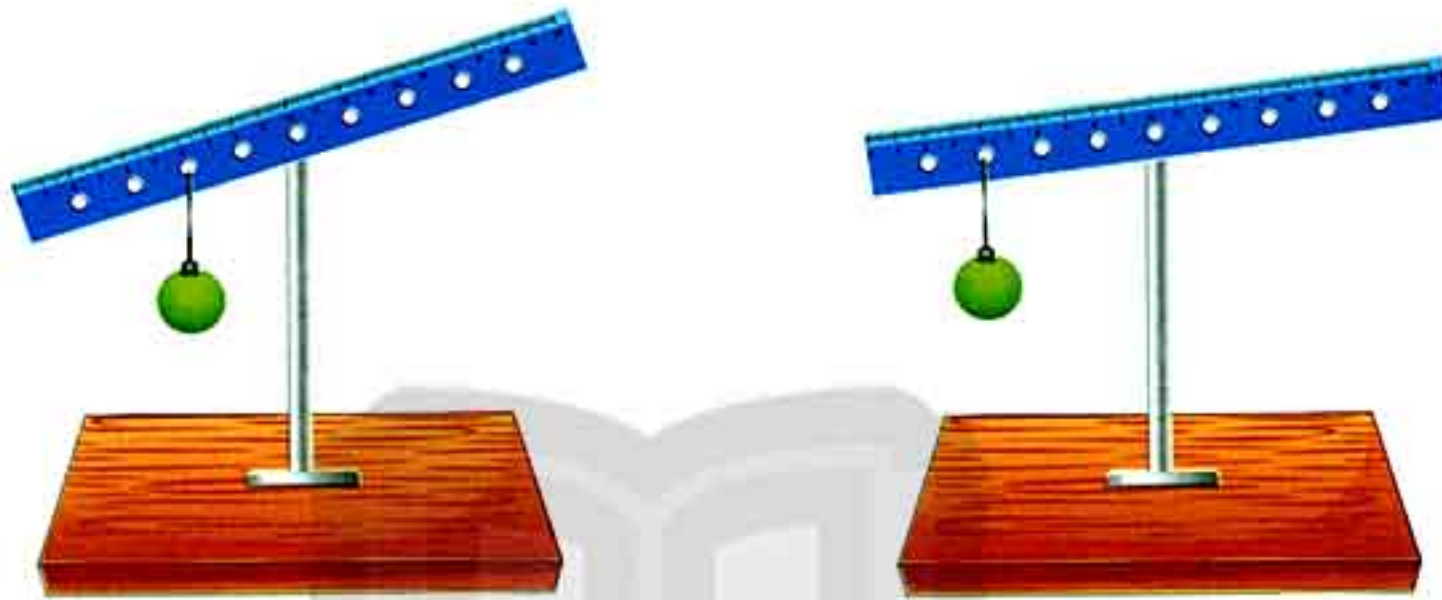
11. In the opposite figure, which illustrates a type of levers. Calculate the length where the weight number 2 is put to make the lever balanced. (Alex. 2018)



12. If the ratio between the length of the resistance arm and the length of the force arm is 5:1 and the value of resistance force is 5 Newton. Calculate the value of the effort force.

13. Habiba and Mohamed sat on the seesaw. Habiba affected the seesaw by a force of 50 Newton, and the distance between her and the fulcrum was 200 cm. Mohamed, on the other hand, affected the seesaw with a force of 60 Newton and the distance between him and Habiba was 150 cm. Find out if the seesaw was balanced or not. Why?

14.  **Determine by drawing:** the number of weights which must be placed at a distance of one hole from the fulcrum to make the lever balanced, where the distance between every two holes is 1 cm.



15. The force affecting a first class lever equals 500 N and the length of its arm is 10 cm. If the value of the resistance equals 200 N and the length of the resistance arm is 20 cm. Is this lever balanced? Why?

If the lever is not balanced, what is the length of the resistance arm required for keeping the balance?



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2

on Lesson

Answer Guide P. 6

1. Examine the opposite picture:

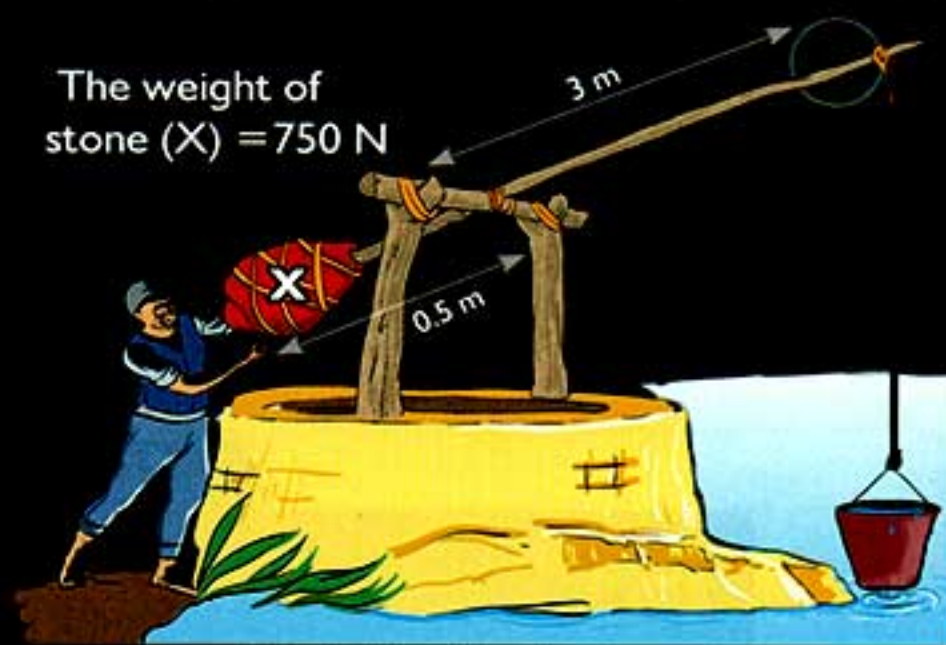
- Specify 3 first class levers in the picture
.....
- What are the benefits of each lever you mentioned?
- Specify a second class level. Does it save effort?
- In the picture: Specify the fulcrum, the effort force and the resistance force for the man referred to by (X).
- If the man referred to by (X) is using a rigid bar with a length of (1.75 m) and exerting an effort force of (20 N) to move the large stone, and the effort arm is (1.5 m). Find the weight of the stone (Show your work).
(Note: the weight of the stone is the resistance force). Does it save effort?



2. Examine the opposite picture:

This farmer is using the shadoof (very old tool) to get water from the canal, if the value of resistance is (200 N) at each time of getting water out, then:

- Find the effort required to lift water (show your work)
- Find the effort actually done by the farmer after using (X).
- Does the tool save effort?



The weight of stone (X) = 750 N

The resistance value here is 200 N

Unit 2

Electric Energy

د. رانيا السعيد
Rania SaYed

Lesson 1 Electric lamps

Objectives:

- Identifying the structure of electric lamps.
- Comparing between series and parallel circuits and connecting lamps in series and parallel.
- Designing a simple circuit with a battery, a switch and a lamp.

Lesson 2 Dangers of electricity and how to deal with it

Objectives:

- Identifying dangers of electricity and precautions in dealing with it in the house.
- Conducting experiments to determine whether some solid materials are conductors or non-conductors of electricity.

Summary

Sources of light

1 Natural sources

Ex. The Sun



- ▶ The Sun is the main source of light on the Earth.

2 Artificial sources

Ex. Candles - oil lamps - fire torches



- ▶ Electric lamps change electric energy into light energy.



- ▶ Thomas Edison is an American inventor who invented the light bulb.

Types of electric lamps

1

Light bulb

Light bulb consists of:

- Glass bulb filled with argon gas.
- Tungsten filament.
- Base of light bulb.

2

Fluorescent lamp

Fluorescent lamp consists of:

- Glass tube filled with argon gas and a little of mercury vapor.
- Two tungsten filaments.
- Two points of connection.

Electric circuit

Closed and continuous path through which the electric current passes.

- ▶ Simple electric circuit consists of:

- Battery, electric wires, switch and lamp.

- ▶ Methods of connecting lamps in the electric circuit:

1. Series connection

2. Parallel connection

- All the electric lamps which are connected in parallel are found in houses, celebrations and weddings.

GEM

Exercises on Lesson

1

Answer Guide P. 7

1 Choose the correct answer:






- The electric lamp is used to change electric energy into energy. (Qalubia 2014)
a. sound b. light c. potential d. kinetic
- The main idea of the electric lamp depends on
a. the heat and glow of the filament
b. the heat and brightness of argon
c. the passing of the electric current in sodium vapor
d. the passing of the electric current in mercury vapor
- 🇪🇬 The filament of light bulbs is made of (Giza 2019)
a. iron b. copper c. sodium d. tungsten
- The function of the inert gas that exists inside the light bulb is to
a. increase the mount of electricity b. decrease the lifetime of the filament
c. increase the lifetime of the filament d. no correct answers
- is used to prevent air from reaching the filament.
a. The base of the lamp b. Tungsten
c. The glass bulb d. No correct answers
- The main idea of the fluorescent lamp depends on the emission of a bright light as a result of passing electric current through a
a. solid substance b. liquid substance
c. gas or a vapor d. no correct answers
- Tungsten is preferred to be used in electric lamps because it (Dakahlia 2018)
a. is a bad conductor of heat b. has a low melting point
c. has a high melting point d. no correct answers
- The inner surface of the fluorescent lamp is covered with (Cairo 2018)
a. mercury b. phosphoric material
c. copper d. tungsten
- All of the following components are not found in the glowing lamp except
a. carbon dioxide b. mercury gas
c. argon gas d. oxygen gas
- The glass tube of the fluorescent lamp contains (Cairo 2019)
a. neon gas b. argon gas
c. argon and a little amount of mercury vapor
d. (a) and (b)

11. You should not play with fluorescent lamps due to the presence of a poisonous vapor inside, which is vapor.
a. water b. sodium c. mercury d. (a) and (b)
12. Which of the following is found in the fluorescent lamp and is not found in the electric bulb? -
(Giza 2019)
a. Neon b. Argon c. Mercury d. Water vapor
13. By increasing the number of lamps connected in series, the intensity of these lamps
(Beheira 2019)
a. increases b. decreases
c. no correct answers d. is not affected
14. In series connection, the electric current will have
(Giza 2018)
a. one path b. two paths c. several paths d. no correct answers
15. When an electric lamp connected in series with other lamps is broken or burnt, the other lamps
(Gharbia 2016)
a. increase in light intensity b. turn off
c. decrease in light intensity d. remain as they are
16. When a lamp is connected in parallel with several lamps, the intensity of the lamps
(South Sinai 2019)
a. decreases b. increases
c. remains as it is d. all the previous answers
17. When lamps are connected in parallel, the electric current will have
a. one route b. two routes c. branched paths d. no correct answers
18. If a number of lamps are connected in parallel, and one of them is broken or removed, then
a. the light intensity of other lamps decreases
b. the light intensity of other lamps increases
c. the light intensity of other lamps disappears
d. the light intensity of other lamps remains as it is
19. The lamps at home are connected
(Minia 2014)
a. in series b. in parallel c. both (a) and (b) d. perpendicularly
20. The electric wires are made of
(Cairo 2019)
a. plastic b. wood c. copper d. sulphur
21. In which of the following circuits, the lamps will turn on? -







Lesson 1

2 Complete the following sentences:




1. is used to convert the electric energy into light energy.
2.  The scientist invented the light bulb. (Luxor 2014)
3. The light bulb is a source of light energy.
4. The electric current in the connection has only one route. (Gharbia 2018)
5. In the home, connection of lamps is better than connection. (Qalubia 2018)
6. The glass bulb of the electric lamp protects the filament against burning by preventing from reaching the filament.
7. The filament of the bulb is made of and that is because it has a high (Damietta 2019)
8. The tube of the fluorescent lamp is empty of and contains inert gas such as (Alex. 2018)
9. In the light bulb, copper wires allow the electric current to pass from to
10. There are two types of lamp bases which are base and base. (Alex. 2019)
11. The fluorescent lamp consists of and
12. The fluorescent lamps contain inert argon gas and a little amount of (Giza 2019)
13. The inner surface of the fluorescent lamp is covered with material. (Fayoum 2019)
14. is used to prevent the tungsten filament from burning.
15. Most lamps contain a kind of inert gas such as gas instead of air.
16.  The simple electric circuit consists of and (South Sinai 2019)
17.  and are two ways for connecting electricity. (Sohag 2019)
18.  All light bulbs are connected in in houses. (Giza 2019)
19. When connecting many light bulbs in series, light intensity
20.  When lamps are connected in, their light intensity decreases by in their numbers. (Beheira 2019)
21. The electric current has only one path when the electric lamps are connected in (Dakahlia 2019)

3 Put (✓) in front of the correct statement and (X) in front of the incorrect one and then correct it:

1. Electric iron converts the electric energy into light energy. ()
2. All gaseous lamps contain neon gas. ()
3. Electric bulbs are one of the most popular sources of natural light. ()
4. The filament of the electric bulb is made of aluminum. (Qalubia 2014) ()

5. The fluorescent lamp contains inert argon gas and a little amount of mercury. (Cairo 2017) ()
6.  The glass bulb contains atmospheric air. ()
7.  The glass bulb of the light bulb contains oxygen gas. (Sohag 2014) ()
8. The glass bulb is used to prevent the air from reaching the filament, and this protects it from burning. ()
9.  The spiral base of the light bulb glows up due to the passing of the electric current through it. (Assuit 2019) ()
10. When disconnecting a lamp from a circuit connected in series, the other lamps keep working. (Sohag 2019) ()
11. Fluorescent lamps are called neon lamps because they contain an inert gas called neon. (Luxor 2016) ()
12. By removing a lamp from a circuit connected in parallel, the other lamps keep working. ()
13. Lamps in houses are connected in series. (Cairo 2017) ()
14. If one of the lamps or electric devices at home is not working, the rest of lamps and devices keep working. ()
15. The light intensity increases in the case of series connection. ()
16. The light intensity decreases in the case of parallel connection. ()
17. The components of the electric circuit are battery and electric lamp only. ()
18. The main source of electric current in the electric circuit is the battery. ()
19. The electric circuit is an open path through which the electric current passes. ()
20.  Electric lamps are connected in parallel in houses. (Fayoum 2012) ()




4 Write the scientific term for each of the following:







1.  A device (means) used to convert electric energy into light energy. (Giza 2019) (.....)
2.  The scientist who invented the light bulb. (Cairo 2013) (.....)
3. They connect the electricity from the base to the filament.
4. The inert gas that prevents the tungsten filament in light bulbs from burning. (.....)
5. Lamps are called neon lamps. (Cairo 2018) (.....)
6. An inert gas found in the glass bulb of the electric lamp. (Gharbia 2014) (.....)
7.  It is a coiled thin wire made of tungsten in the light bulb. (South Sinai 2019) (.....)

Lesson 1





8. An inert gas that is not used in making fluorescent lamps; however, the lamps are named after this gas. (.....)
9. A type of lamps whose inner surfaces are covered with phosphoric material. (Dakahlia 2012) (.....)
10. Lamps that depend on heating and glowing of the filament by electricity. (.....)
11. It prevents air from reaching the filament to protect it from burning. (.....)
12. The material that covers the inner surface of the glass tube in fluorescent lamp. (Giza 2012) (.....)
13. It carries the lamp in upright position and connects the lamp to electricity. (Beheira 2014) (.....)
14. The method of connecting electric lamps and machines at home. (Dakahlia 2019) (.....)
15. The base of light bulb that contains two pieces of lead. (Alex. 2018) (.....)
16. A method where electric lamps are connected in branching routes. (Cairo 2019) (.....)
17. It is a way in which the light bulbs are connected one after another in one route. (Alex. 2019) (.....)
18. A way of connecting the electric lamps in which all the lamps are turned off when one of them burns out. (Giza 2019) (.....)
19. A substance that is used in making the filament of the light bulb. (Beheira 2018) (.....)
20. It is a closed and continuous path through which the electric current passes. (Cairo 2014) (.....)
21. The source of electricity in the electric circuit. (.....)
22. A circuit that contains a lamp, conducting wires, a switch and a battery. (.....)

5 Correct the underlined words:

1.  The electric lamp converts the electric energy into kinetic energy. (Cairo 2019) (.....)
2. Newton is an American inventor who invented the electric lamp. (Alex. 2018) (.....)
3.  The electric lamp contains hydrogen gas. (Cairo 2019) (.....)
4.  The glass bulb of the light bulb contains an active gas. (Menofia 2016) (.....)


5.  The filament of the light bulb is made of carbon. (Assiut 2017) (.....)
6. The fluorescent lamp consists of one filament of tungsten. (.....)
7.  There is one kind of bases for the electric bulb. (.....)
8. Fluorescent lamp contains the inert neon gas. (Giza 2019) (.....)
9. When connecting more than one lamp in series in the electric circuit, the light intensity of lamps increases. (Beni Suef 2011) (.....)
10.  There are two connecting points at each end of the light bulb. (Aswan 2014) (.....)
11.  To connect lamps in parallel, the lamps are connected one after the other. (Giza 2019) (.....)
12.  When electric lamps are connected in series, they continue to work if a lamp is damaged. (.....)
13.  The electric lamps are connected in houses in series. (Kafr El-Sheikh 2019) (.....)
14. When connecting more than one lamp in parallel in an electric circuit, the light intensity decreases. (.....)
15. The electric current is divided into several paths in case lamps are connected in series. (.....)

6 Give a reason for each of the following:

1. The presence of argon gas in glowing lamps. (Kafr El-Sheikh 2019) (.....)
2. There is a glass bulb around the filament. (.....)
3.  The glass bulb is filled with inert argon gas. (Port Said 2014) (.....)
4. There are two pieces of lead in the light bulb. (Cairo 2019) (.....)
5.  There are two points of connection to each tip of the fluorescent lamp. (Dakahlia 2019) (.....)
6. The importance of the filament of the light bulb. (Alex. 2018) (.....)
7. There must be a switch in the electric circuit. (.....)
8. The presence of the battery in the electric circuit. (.....)
9.   Decorative lamps are connected in parallel not in series. (Alex. 2019) (.....)

Lesson 1

7 What happens when ...?


1. There is no glass bulb in the light bulb. (Cairo 2017)
2. The two metallic pieces are not found in the base of the light bulb. (Menofia 2017)
3. The absence of the argon gas in the glass bulb of the light lamps.
4. The electric lamp contains atmospheric. (Cairo 2019)
5. A lamp connected in series in an electric circuit is burnt. (Beni Suef 2018)
6. Connecting more than one lamp in an electric circuit in parallel. (Cairo 2019)
7. Connecting more than one lamp in an electric circuit in series.
8. You make the filament of the light bulb from iron.
9.  Opening the electric circuit by using the electric switch. (Sohag 2014)
10. The light bulbs in the house are connected in series. (Damietta 2019)
11. One of the electric lamps burns out, while it is connected in parallel with the other. (Dakahlia 2019)

8 What is meant by ...?

1. Electric lamps.
2.  Electric circuit. (Damietta 2013)
3. Parallel connection.
4. Series connection.

9 Compare between each of the following:

(Ismailia 2018)

1.  Parallel connection and series connection with respect to light intensity and removing one of the lamps from the connection.
.....
2. The light bulb and fluorescent lamp in respect of the structure, the gas used and uses.
.....

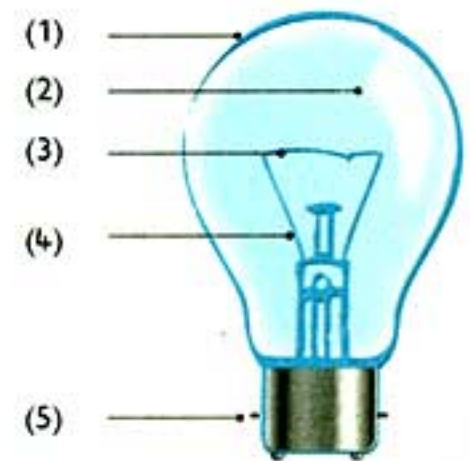
10 Explain with drawing the components of the simple electric circuit.**11 Mention one function for each of the following:**

1. Electric lamps.
.....
2. The tungsten filament inside the electric bulb. (Cairo 2011)
.....
3. The fluorescent lamp. (Sohag 2017)
.....
4. The glass bulb in the electric lamp. (Cairo 2019)
.....
5. The base of the electric bulb. (Ismailia 2018)
.....
6. Connecting electric lamps in parallel.
.....
7. The inert argon gas that is used in the electric lamp. (Cairo 2019)
.....
8. The points of connection in the fluorescent lamp. (Cairo 2019)
.....

12 Look at the opposite figure and then answer:

(Giza 2018)

- a. The name of this device is
- b. Label the figure:
 1.
 2.
 3.
 4.
 5.

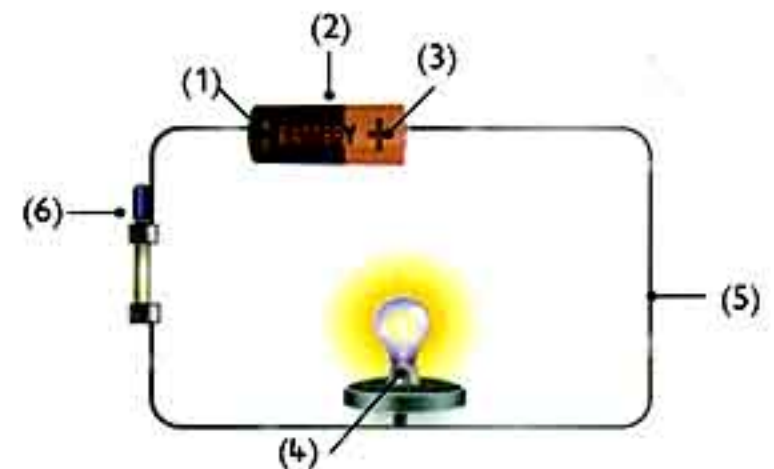


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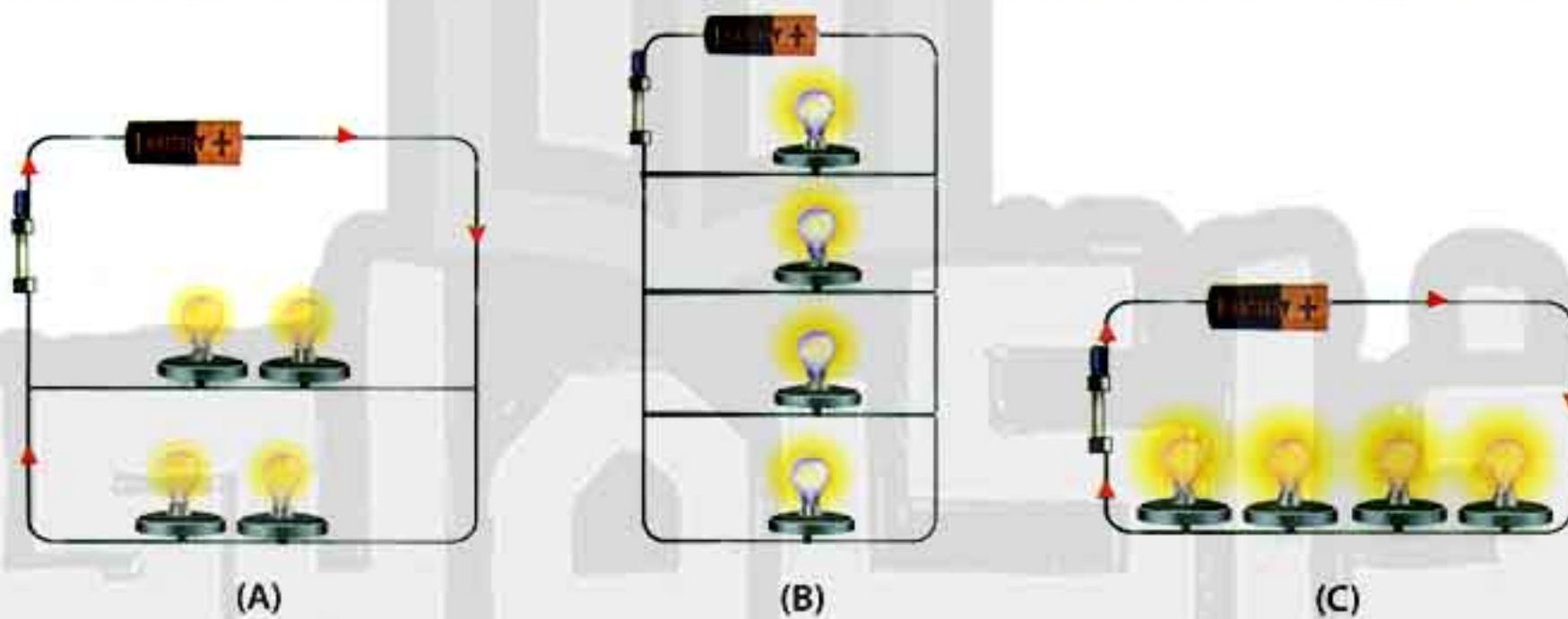
13 Look at the opposite figure and then answer:

(Ismailia 2018)

- What is the name of this figure?
- Write the labels.
 -
 -
 -
 -
 -
 -



14 The following figures represent three electric circuits (A), (B) and (C): (Giza 2019)



- In which circuit are the electric lamps connected in series?
- In which circuit are the electric lamps connected in parallel?

15 Choose from column (B) what suits in column (A):

(South Sinai 2013)

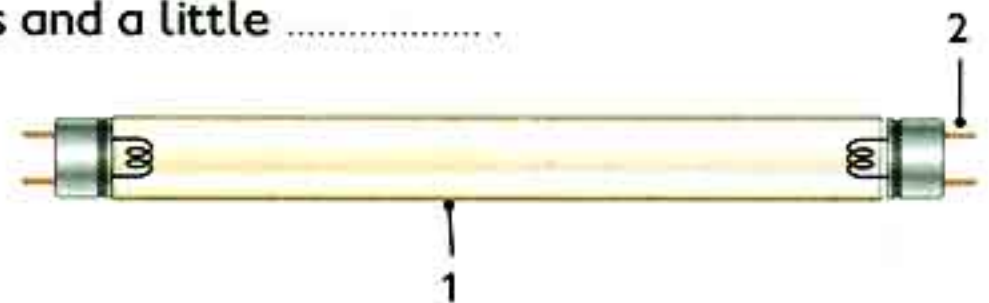
(A)

(B)

1. Light bulb	a. is in series.
2. Connecting electric lamps in houses.	b. is in parallel.
3. The filament of the light bulb.	c. changes electric energy to light energy.
	d. is/are made of nichrome wire.
	e. is/are made of tungsten wire.

16 Look at the following figure and then answer:

- The fluorescent lamp contains gas and a little
- Label the figure:
 -
 -



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Like Questions

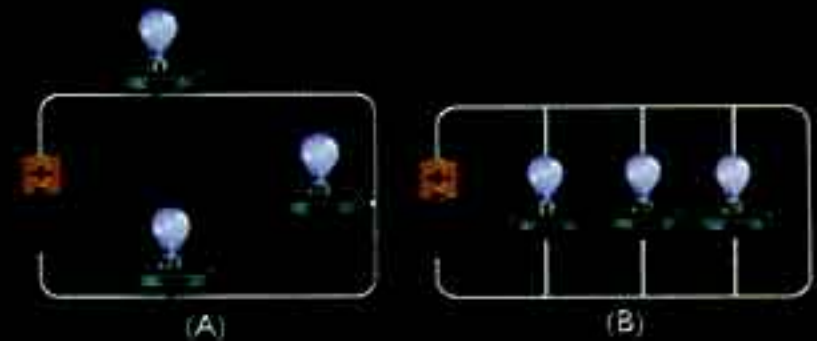
on Lesson

Answer Guide P. 8

1. Look at the following circuits and answer:

1. For an electric current to flow through an electric circuit you need:

- ☐ only a complete circuit
☐ a supply current and complete circuit
☐ only a supply current



2. Write the suitable letter in front of the correct statement which describes both figures (A) and (B):

- ☐ Two bulbs in series and one in parallel
☐ Three bulbs in series. ☐ Three bulbs in parallel.

3. If one of the bulbs breaks in the circuits (A) and (B), what happens to the other two bulbs: choose the correct answer/s for figures (A) and (B):

- ☐ They both go out. ☐ They both remain on.
☐ One remains on and the other goes out.

4. If a fourth bulb is added in figures (A) and (B), what happens to the other bulbs? Write the suitable letter in front of the correct statement which describes both figures (A) and (B).

- ☐ The bulbs remain the same. ☐ The bulbs become dimmer.
☐ The bulbs become brighter.

2. A student sets up a circuit as shown in the diagram.

- He places each of the items that will complete the circuit to light the lamp.

a. Which items will connect the circuit between (A) - (B) to light the lamp?

Tick (✓) the correct item.


 Metal paper clip


 Plastic ruler


 Iron nail


 Eraser

b. Which name is given to the material that doesn't conduct electricity?

Summary

Electricity has many benefits:

- 1 Cooking food and preserving it cold.
- 2 Lighting our houses.
- 3 Lighting factories and streets.
- 4 Operating some home appliances such as radio and TV.

Materials are classified according to their electrical conductivity into:

1 Electric conductors

- Materials that allow the electric current to pass through.
- They close the electric circuit.

Ex.

iron - copper - lead

2 Electric insulators

- Materials that do not allow the electric current to pass through.
- They open the electric circuit.

Ex.

wood - plastic - glass

Injuries resulting from the improper use of electricity:

- 1 Indirect injuries: falling down from top of the ladder due to electric shock.
- 2 Direct injuries which include:

Electric shock

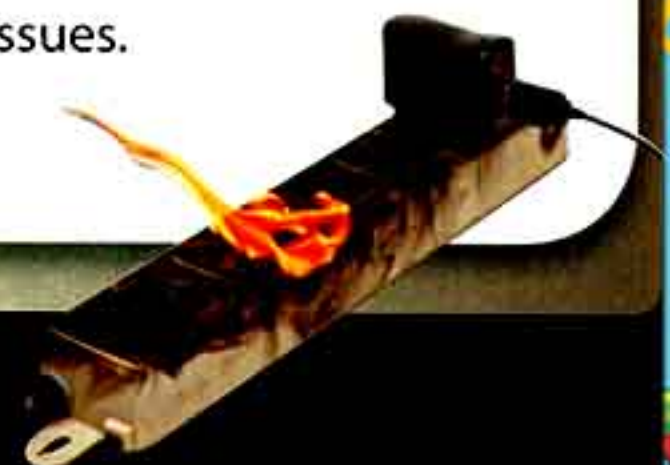
- One of the dangers of electricity resulting from the passing of the electric current through the human body.

Electric fires

- One of the dangers of electricity resulting from increasing the temperature of machines.

Electric burns

- One of the dangers of electricity causing the damage of body tissues.



GEM

Exercises on Lesson

2

Answer Guide P. 9

1 Choose the correct answer:



- is a good conductor of electricity. (Luxor 2016)
a. Wood b. Iron c. Plastic d. Glass
- All the following materials allow for the flow of the electric current except (Damietta 2016)
a. iron b. copper c. rubber d. aluminum
- Dangers of electricity include
a. electric fires b. electric shock c. electric burn d. (a), (b) and (c)
- Among the bad conductors of electricity is (Cairo 2016)
a. aluminum b. copper c. iron d. plastic
- The harm resulting from the electric shock depends on
a. the intensity of the electric current only
b. the time of the flow of the electric current
c. the direction of the electric current
d. the intensity and flow time of the current in the body
- Which of the following is among the causes of electrical burns? -
a. A part of your body touches an electric machine that generates heat
b. A part of your body touches a wire that is connected to electricity
c. A part of your body touches a spark that results from an electric current
d. (a) and (c)
- The operation of plugging more than one machine in the same socket leads to (Gharbia 2017)
a. electric shock b. increasing electric load
c. electric burn d. all the pervious answers
- Among the causes of fires resulting from electricity is
a. placing a device that produces heat near textiles b. overload
c. not disconnecting electricity from heat generator machines
d. all the previous answers
- The handles of the electric devices are made of
a. iron b. copper c. plastic d. aluminum

10. Water is not used in putting out fires resulting from electricity because
(Giza 2019)
- a. water is a bad conductor of electricity b. water is a good conductor of electricity
c. water doesn't harm rescuers d. water limits the fire
11. The cause of the electric shock that may happen to a person is
a. the electric current passing through the human body
b. placing a device that generates heat near textiles
c. touching flames resulting from fire
d. touching a device that produces heat to part of the body
12. Electricity is transferred from the power stations to houses through cables covered with
a. tin b. copper c. plastic d. aluminum
13. Among the precautions when dealing with electricity is
a. not to play with the electric connections
b. to leave some wires uncovered
c. to leave the electrical devices on for a long time
d. all the previous answers
14. Electric wires must be covered with
a. glass b. plastic c. wood d. copper
(Giza 2019)
15. The electric shock causes
a. electric fire b. electric burns c. electric current d. no correct answers
16. Connecting more than one electric device in the same socket leads to
a. electric shock b. overload c. electric burn d. (a) and (b)
(Cairo 2018)





2 Complete the following sentences:


- Electricity is used to operate some machines such as, and
- Materials are divided into and according to their conductivity of electricity.
(Sharkia 2012)
- The electric shock occurs as a result of passing through the human body.
(Dakahlia 2018)
- Copper is a conductor of electricity, while plastic is
- The substances that allow electricity to flow through are called such as
- is a good conductor of electricity, while wood is a conductor of electricity.
- Substances that don't allow electricity to pass through are called
- and are some of the dangers of direct electricity. (Alex. 2019)
- Electricity flows in circuits.

Lesson 2




10.  Metallic materials are considered electric, while glass and rubber are considered electric (Assuit 2019)
11. The two types of electric injuries are and
12. The electric overload is the reason of (Cairo 2017)
13. Water is used to put out fires, while is used to put out electric fires.
14. results from passing an electric current through the human body. (Gharbia 2014)
15.  The leads to destroying the tissues of the body. (South Sinai 2019)
16. You should place a piece of in the electric socket.
17. Electric cables are covered with materials. (Qena 2014)
18. From the precaution in dealing with electricity and (Giza 2019)

3 Put (✓) in front of the correct statement and (X) in front of the wrong one:



1.  Plastic is a good conductor of electricity. (South Sinai 2013) ()
2. Iron, aluminum and copper are considered electric conductors. (Luxor 2012) ()
3.  Electric insulators allow for the flow of electric current through them. (Qena 2014) ()
4. The electric burn causes damage of the body tissues. (Cairo 2016) ()
5. A person suffering from an electric shock has to be isolated from the electric circuit by pushing him away with a piece of aluminum. ()
6. Fires resulting from electricity are extinguished by water. (Cairo 2019) ()
7. The electric fire happens when the electric current passes through the human body. ()
8.  The electric shock occurs as a result of the electric current passing through the human body. (Sohag 2017) ()
9. Fires, electric shocks and electric burns are among the dangers of electricity. (Cairo 2011) ()
10. A wooden bar is used to push the injured during electric accidents. (Qena 2012) ()
11. The human body is a bad conductor of electricity. (Cairo 2019) ()
12. After using the electric iron, it is preferable to put it near a carpet. ()
13. Touching spark resulting from the electric fire causes electric shock. (Matrouh 2014) ()
14. The handles of the electric tools are made of copper. ()
15. The electric current doesn't pass in an open electric circuit. ()
16. Electric fire causes damage to human tissues. ()
17.  You must avoid placing flammable materials close to electric machines that generate heat. ()

18.  If the injured with an electric shock can't breathe, start immediately artificial respiration. ()
19. The electric overload causes electric fires. (Cairo 2018) ()




4 Write the scientific term for each of the following:

-  Materials that allow the electric current to pass through. (Dakahlia 2019) (.....)
-  Materials that don't allow the electric current to pass through. (Giza 2019) (.....)
- A type of injuries including fires resulting from electricity, electric shock and electric burns. (Giza 2018) (.....)
- One of the electric dangers that damage body tissues. (Cairo 2019) (.....)
- A material used in making electric wires. (.....)
-  Fires that happen as a result of overheat of electric devices (overload). (Sharkia 2017) (.....)
- It occurs when the electric current passes through the human body. (Giza 2018) (.....)
- One of the dangers of electricity that results from plugging more than one device in one socket. (.....)
- One of the dangers of electricity that results from touching uncovered wire. (.....)
- Injuries caused by electricity which are not a direct cause. (Kafr El-Sheikh 2019) (.....)
- It is one of the dangers of electricity that occurs due to passing the electric current through the human body. (Qena 2019) (.....)





5 Correct the underlined words:

-  Wood is considered a good conductor of electricity. (Beheira 2014) (.....)
-  Electric fires happen when electricity passes through the human body. (Aswan 2012) (.....)
- Electricity is safe if we deal with it carelessly. (.....)
- The electric shock happens when touching flames resulting from fire. (.....)
- The electric damage that causes destruction to the body tissues is called electric shock. (.....)
- Among the causes of electric fires is decreasing electric load. (.....)
- Water is not used to put out regular fires. (Ismailia 2017) (.....)

Lesson 2

8.  Fires resulting from electricity are extinguished by water.
(Sharkia 2012) (.....)
9.  The human body is a good conductor of electricity as it contains gases.
(Cairo 2019) (.....)
10.  Glass is among electric conductor substances. (.....)
11. Among safety precautions when dealing with electricity is leaving electric wires uncovered. (.....)
12. Plugging more than one machine to one socket causes electric shock.
(Giza 2019) (.....)

6 Give a reason for each of the following:

1. Plastic is considered an electric insulator. (Kafr El-Sheikh 2014)
.....
2.  Water is not used to put out electric fires. (Giza 2019)
.....
3. It is advisable not to place the heater next to the carpets and textiles.
.....
4. Electric wires are made of copper. (Qalubia 2013)
.....
5. Handles of screwdrivers and electric tools are made of rubber or glass.
.....
6.  The electric cables are covered by insulating materials. (Luxor 2014)
.....
7. It is advisable to decrease the load on the connection network in houses.
.....
8. Uncovered electricity should never be touched.
.....
9. It is advisable not to touch electric switches with wet hands.
.....
10.  Not placing flammable materials close to the electric machines that generate heat. (Cairo 2019)
.....
11.  Not placing any metallic objects inside the socket. (Giza 2018)
.....
12. Plugging more than one machine in one socket causes electric fires. (Cairo 2019)
.....

13. ⚡ Pushing the injured by anything that is non-conductor of electricity such as a piece of wood. (Red Sea 2012)

14. ⚡ Placing a piece of plastic in the socket. (Qena 2011)

7 What happens when ...?

1. Touching a source of electricity directly with a part of your body.

2. Placing an electric heater near to furniture. (Fayoum 2019)

3. Pushing a person suffering from an electric shock with an iron bar to isolate him from the source of electricity.

4. ⚡ A man touches uncovered wire that has an electric current. (Sharkia 2017)

5. Using sand to put out electric fires.

6. ⚡ Electric wires are left uncovered and non-insulated. (Fayoum 2014)

7. ⚡ Electricity is not handled cautiously.

8. Insulating the injured from electric current by pushing him with a piece of wood.

9. Putting out an electric fire by water. (Sohag 2019)

10. You insert a metallic bar in an electric socket. (Cairo 2019)

8 Mention one function or benefit or harm for each of the following:

1. Not disconnecting electric devices that produce heat.

2. Electric insulators. (Ismailia 2017)

3. Electric shock.

Lesson 2

4. Electric overload.
.....
5. Water is used as a fire extinguisher.
.....
6. Electric burns on body tissues.
.....
7. Copper is used in making wires.
.....
8. Wires are covered with plastic.
.....

9 What are the dangers that happen in the following cases?

1. Leaving electric wires without covering them with insulators.
.....
2. Placing an electric device that generates heat near some clothes.
.....
3. Operating more than one electric device through one socket.
.....
4. Touching a wire through which an electric current is flowing, while being connected to the ground.
.....
5. Placing electric wires under the carpet.
.....

10 How do you advise the following persons?

1. Some people are putting out an electric fire using water.
.....
2. A person is trying to save another person who is suffering from an electric shock.
.....

11 Mention some safety precautions when dealing with electricity.

(Menofia 2011)

.....
.....
.....

12 What are the injuries resulting from misusing electricity?

.....
.....

13 Compare between electric conductors and electric insulators. (Port Said 2017)

Electric conductors	Electric insulators
.....
.....

14 Define:

1. The electric shock.

.....

2. Electric fires.

.....

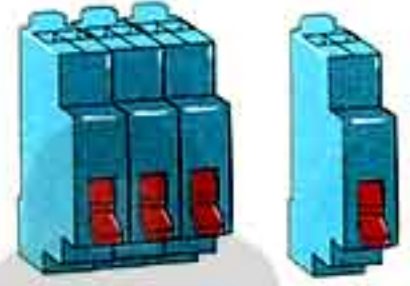
3. Direct injuries.

(Giza 2019)

15 The opposite figure represents an automatic switch.

What is its importance in houses?

.....



16 Examine:

The following pictures represent some negative behaviors when dealing with electricity. What is the harm caused by such behaviors?



a.



b.



c.



d.

17 State the reasons for the fire resulting from electricity. (Giza 2012)

.....

.....

.....



I help my family prepare food at home. I prefer home-made food to fast food.



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Like Questions

2

on Lesson

Answer Guide P. 10

1. Look at the following pictures and then answer:



a. Specify the wrong behaviors in this house and correct them.

.....

.....

.....

b. Mention the type of electric connection in this house.

.....

2. One of your friends had an electric shock when he was playing with a wire connected to an electric source.

Rearrange the right behaviors to rescue your friend:

- ☐ a. Call the doctor immediately.
- ☐ b. Press on his chest with palms of your hands.
- ☐ c. Open up the tight clothes to facilitate his breathing.
- ☐ d. Insulate your friend from the electric current by pushing him with a piece of wood.
- ☐ e. If he can't breathe, start the artificial respiration immediately.

Unit 3

The Universe

Lesson 1 The solar eclipse

Objectives:

- Identifying the phenomenon of the solar eclipse.
- Doing activities to explain types of the solar eclipse.
- Identifying safety precautions on observing the solar eclipse.

Lesson 2 The lunar eclipse

Objectives:

- Identifying the phenomenon of the lunar eclipse.
- Doing activities to explain types of the lunar eclipse.
- Comparing between the solar eclipse and the lunar eclipse.

Summary

Solar eclipse: An astronomical phenomenon which occurs when the Earth, the Moon and the Sun are on one straight line with the Moon in the middle.

Types of solar eclipse:

P.O.C.	Total solar eclipse	Partial solar eclipse	Annular solar eclipse
1. Shape of the Sun	• Disappears completely (dark disc)	• Partial disappearing (Incomplete disc)	• Appears as a lighted ring.
2. Type of the shadow in which it is seen	• Umbra.	• Penumbra.	• Antumbra.
3. Position of the Moon	• Nearer to the Earth	• Farther or nearer to the Earth	• Farther from the Earth. (In a higher orbit).

► The phenomenon of solar eclipse does not last for more than seven minutes and forty seconds.



► Doctors warn of the direct observation of the solar eclipse due to the harmful rays which the Sun emits during this phenomenon as these rays cause blindness for few minutes.

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Exercises on Lesson

1

Answer Guide P.11

1 Choose the correct answer:

- In the shadow area of a tree, you feel (Cairo 2014)
a. hotter b. moderately hot c. colder d. no correct answers
- Solar eclipse is formed when the Earth, the Sun and the Moon lie on one straight line and (Sohag 2018)
a. the Earth lies between the Moon and the Sun
b. the Moon lies between the Earth and the Sun
c. the Sun is perpendicular to both the Earth and the Moon
d. no correct answers
- is a phenomenon through which the sunlight is blocked by moon from reaching the surface of Earth.
a. Solar eclipse b. Lunar eclipse c. Rainbow d. All the previous answers
- The solar eclipse is formed in the area. (Port Said 2015)
a. umbra b. penumbra
c. cone shadow of Earth d. Earth's shadow on the Moon
- Shadow is a area where the solar eclipse occurs.
a. lighting b. dark c. clear d. (a) and (c)
- is a semi-dark area where only a part of the light reaches the Earth.
a. Umbra b. Penumbra c. Antumbra d. No correct answers
- During a total solar eclipse, the Earth is located in the area.
a. Moon's cone shadow b. extension of Moon's cone shadow
c. Moon's penumbra d. the Earth's cone shadow
- The type of eclipse differs according to the movement of in front of the Sun. (Qalubia 2014)
a. Earth b. Moon c. Mercury d. Mars
- The Moon revolves around the Earth in
a. an elliptical orbit b. a circular orbit
c. a spherical orbit d. no correct answers
- The partial solar eclipse is formed in the area
a. umbra b. penumbra
c. cone shadow of Earth d. Earth's shadow on the Moon
- When the cone shadow does not reach the Earth's surface, is formed.
a. partial solar eclipse b. annular solar eclipse
c. total solar eclipse d. no eclipse

الصف السادس الابتدائي

15. Looking at the Sun during the solar eclipse may cause for few minutes.
 16. The sun emits rays which is harmful to the eyes such as and

3 Put (✓) in front of the correct statement and (X) in front of the incorrect one, then correct it:

1. Light travels in straight lines. ()
2. The Moon rotates around the Earth in an oval orbit. ()
3. Shadow is the lighting area where the solar eclipse occurs. ()
4. Solar eclipse is formed when the Moon and the Sun lie on the same straight line with the Earth in the middle. ()
5. The types of the solar eclipse differ according to the movement of the Earth in front of the Sun. (Alex. 2014) ()
6. Penumbra is a dark inner shadow in which the solar eclipse occurs. ()
7. More than one type of solar eclipse can be observed. (Cairo 2019) ()
8. Total solar eclipse is formed in the penumbra area of the Moon. ()
9. Partial solar eclipse is formed in the umbra area of the Moon. ()
10. Annular solar eclipse is formed when the cone shadow reaches the Earth. ()
11. We can not see the Sun in the area of the umbra. ()
12. The solar eclipse takes four minutes and few seconds. ()
13. To observe the solar eclipse safely you should wear special sunglasses. ()
14. Both ultraviolet and infrared rays are useful for man. ()
15. We can look directly at the Sun during a solar eclipse because its glowing is weak. (Luxor 2012) ()
16. Looking directly at the Sun causes severe damage to the eye. ()
17. Telescopes are used to watch the solar eclipse. ()

4 Write the scientific term for each of the following:

1. An astronomical phenomenon that is formed when the Moon lies between the Earth and the Sun on the same straight line. (Giza 2019) (.....)
2. A dark area where no light reaches the Earth at all. (.....)
3. A semi-dark area where only part of the light reaches the Earth. (.....)
4. A dark area that looks like the cone. (.....)
5. The region in which total solar eclipse occurs. (Beni Suef 2018) (.....)
6. Blocking sunlight, totally, at daytime. (New Valley 2011) (.....)
7. The area that lies between the real shadow area and the lighted area. (Giza 2019) (.....)
8. The area where light is blocked totally due to the presence of a dark object in its path. (.....)
9. The region that is formed as a result of blocking the light by an object. (Alex. 2018) (.....)
10. The solar eclipse that occurs in the shadow area of the Moon. (Qena 2018) (.....)

Lesson 1

11. Type of solar eclipse in which we can't see the Sun completely. (Cairo 2019) (.....)
12. A natural phenomenon where the sun appears as a dark disk. (.....)
13. A natural phenomenon where the sun appears as an incomplete disk. (.....)
14. A natural phenomenon where the sun appears as a black surrounded by a shining ring. (.....)
15. Harmful rays emitted from the Sun during the solar eclipse. (.....)
16. A part of human eye is harmed when looking directly to the Sun. (Qalubia 2018) (.....)

5 Correct the underlined words:

1. Sunlight travels in zigzag lines. (.....)
2. Solar eclipse is formed when Earth, Sun and Moon lie on straight line with Earth in the middle. (.....)
3. Shadow is the lighting area where the solar eclipse occurs. (.....)
4. The type of solar eclipse differs due to the movement of the Earth in front of the sun. (.....)
5. Partial solar eclipse occurs when the Moon's cone shadow (umbra) does not reach the Earth. (Cairo 2019) (.....)
6. Annular solar eclipse occurs in the semi-shaded area of the Moon. (Giza 2019) (.....)
7. Solar eclipse duration doesn't extend more than two hours and forty seconds. (Beheira 2019) (.....)
8. The total solar eclipse is formed in the semi-shaded area of the Moon on the Earth. (.....)
9. During annular solar eclipse, the Sun appears as an incomplete disk. (.....)
10. In the penumbra area of the Moon, we can see a part of the Sun forming a total solar eclipse. (.....)
11. The total solar eclipse occurs when the Moon comes in a higher orbit away from the Earth. (.....)
12. Looking directly at the lunar eclipse is harmful to the eye. (Port Said 2019) (.....)
13. Ultraviolet and infrared rays are useful to the human eye. (.....)
14. To observe the solar eclipse safely you should wear lenses. (.....)

6 Give a reason for each of the following:

1. The occurrence of solar eclipse phenomenon. (Cairo 2017) (.....)
2. The type of eclipse changes by the movement of the Moon in front of the Sun. (.....)
3. The distance between the Moon and the Earth varies during rotation. (.....)
4. The Moon blocks sunlight when it comes between the Earth and the Sun. (.....)
5. We can't see the Sun completely during the total solar eclipse. (.....)

6. The total solar eclipse is formed when the Moon rotates nearer to the Earth.
7. The annular solar eclipse is formed when the Moon comes in an orbit higher than the Earth.
8. Special sunglasses must be used to look at the solar eclipse. (Beheira 2018)
9. We shouldn't look directly at the Sun with naked eye during the solar eclipse. (Cairo 2019)

7 What happens in the following cases?

1. The Earth, the Sun and the Moon lie on the same straight line with the Moon in the middle. (Sohag 2018)
2. Looking at the Sun during its eclipse without special sunglasses. (Alex. 2018)
3. An object is put between a light source and screen. (Alex. 2016)
4. We use special sight devices such as a telescope to see the solar eclipse.
5. The Moon lies in a higher orbit from the Earth. (Cairo 2019)

8 Define:

1. The solar eclipse.
2. Cone umbra.
3. The penumbra.
4. Annular solar eclipse.
5. Total solar eclipse.
6. Partial solar eclipse.

9 Compare between:

1. Shadow and semi-shadow.

Shadow	Semi-shadow

2. Total solar eclipse , partial solar eclipse and annular solar eclipse.

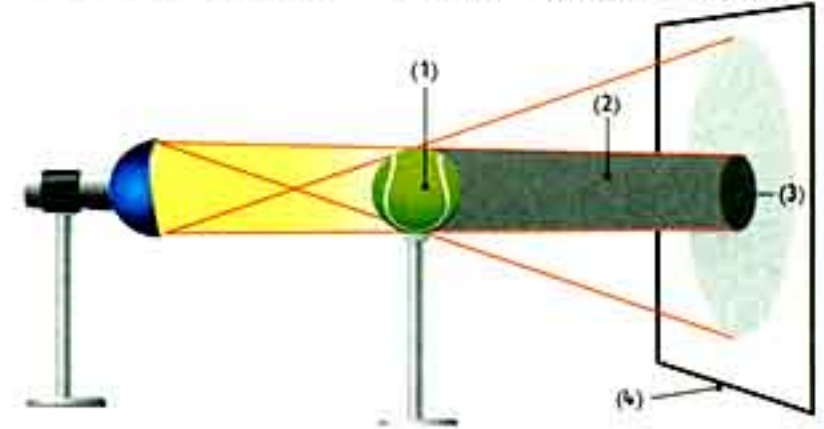
Total solar eclipse	Partial solar eclipse	Annular solar eclipse

Lesson 1

10 Mention the safety precautions during the solar eclipse:

11 Label the opposite figure:

1.
2.
3.
4. The screen represents

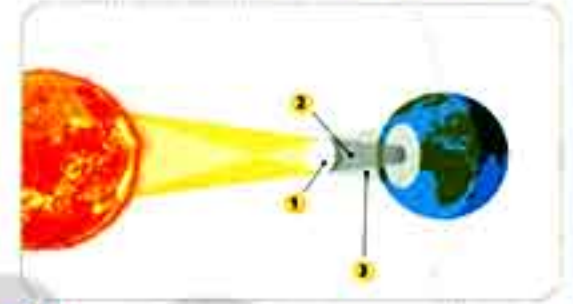


12 Examine the following figure, then Label:

(Dakahlia 2014)

- Write the labels on the figure.

1.
2.
3.



13 Match the sentences in (A) with the suitable words in (B):

(A)	(B)
1. The region which the sunlight not reach	a. annular solar eclipse
2. The region where a part of the sunlight reaches the Earth	b. partial solar eclipse
3. The phenomenon through which the sunlight is totally blocked	c. total solar eclipse
4. The phenomenon through which part of the sunlight is blocked	d. penumbra area
5. The phenomenon through which the Sun is surrounded by a shining ring	e. umbra area

1.
2.
3.
4.
5.

14 Write down the name of the phenomenon that describes the shapes of the Sun in each of the following cases. Give an explanation to why it is formed:

(Giza 2015)



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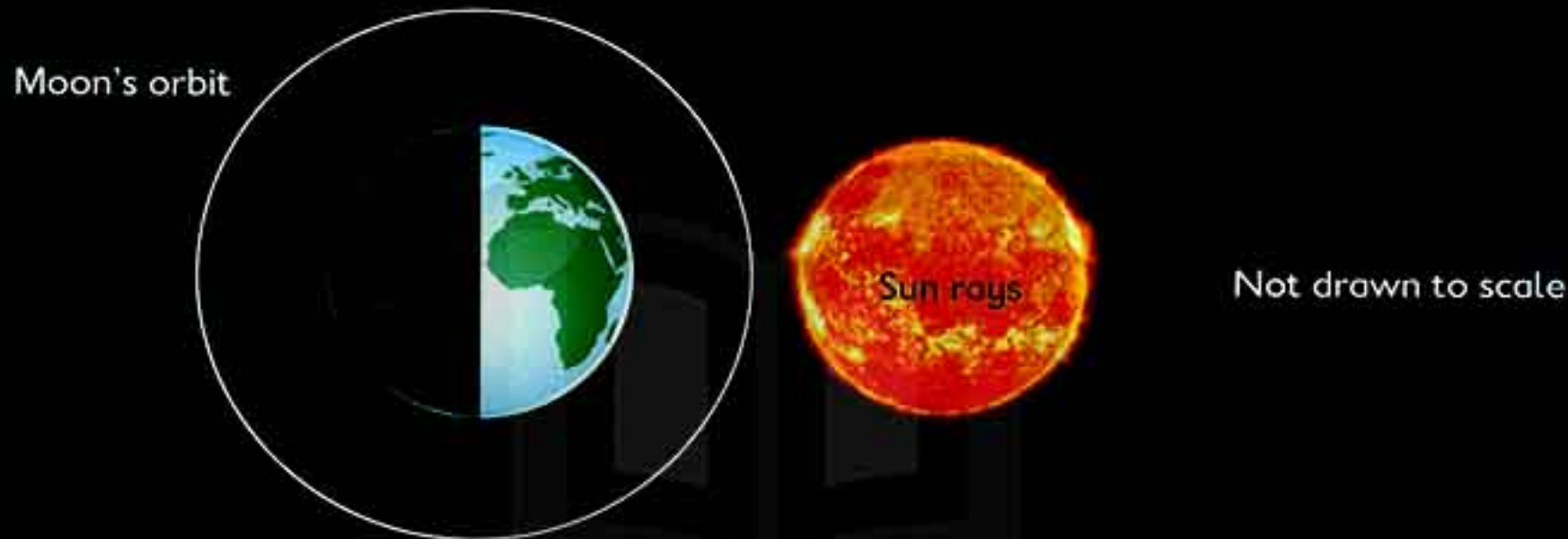
Like Questions



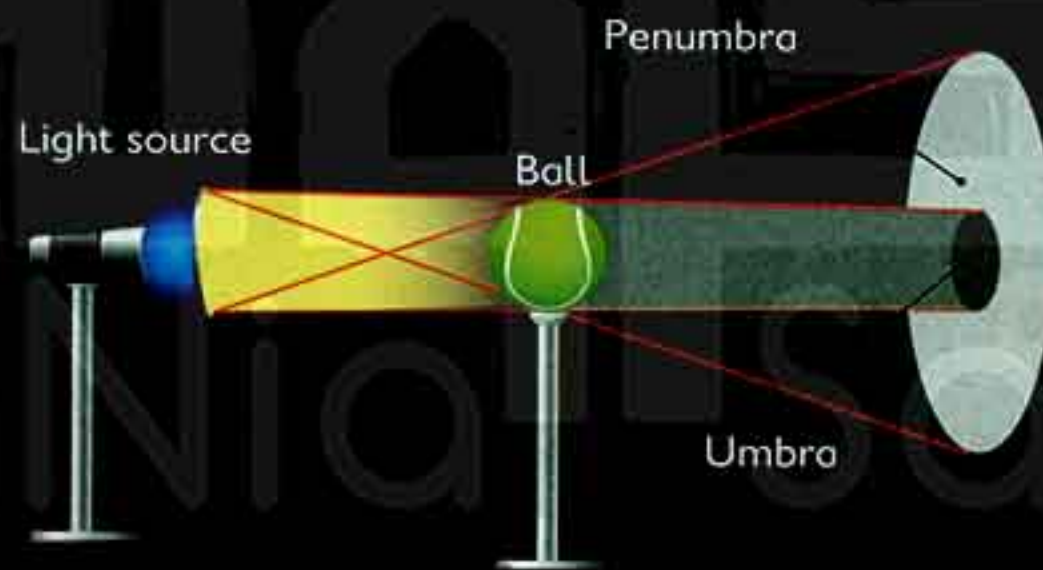
on Lesson

Answer Guide P. 12

1. On the diagram below, place an X on the Moon's orbit to show the Moon's position during a solar eclipse.



2. Direction: Use the following diagram to write the letter of the term that correctly answers each question:



1. According to the diagram, what does the light shining on the ball create?	A. The Moon
2. How many parts does the shadow have?	B. Sun - Earth - Moon
3. What is the central, darker part of the shadow called?	C. A shadow
4. What is the lighter part of the shadow where light is partially blocked called?	D. The umbra
5. In case of a solar eclipse, what does the light source in the diagram represent?	E. Two
6. In case of a solar eclipse, what does the ball in the diagram represent?	F. The penumbra
7. What is required for an eclipse to occur?	G. The Sun

Summary

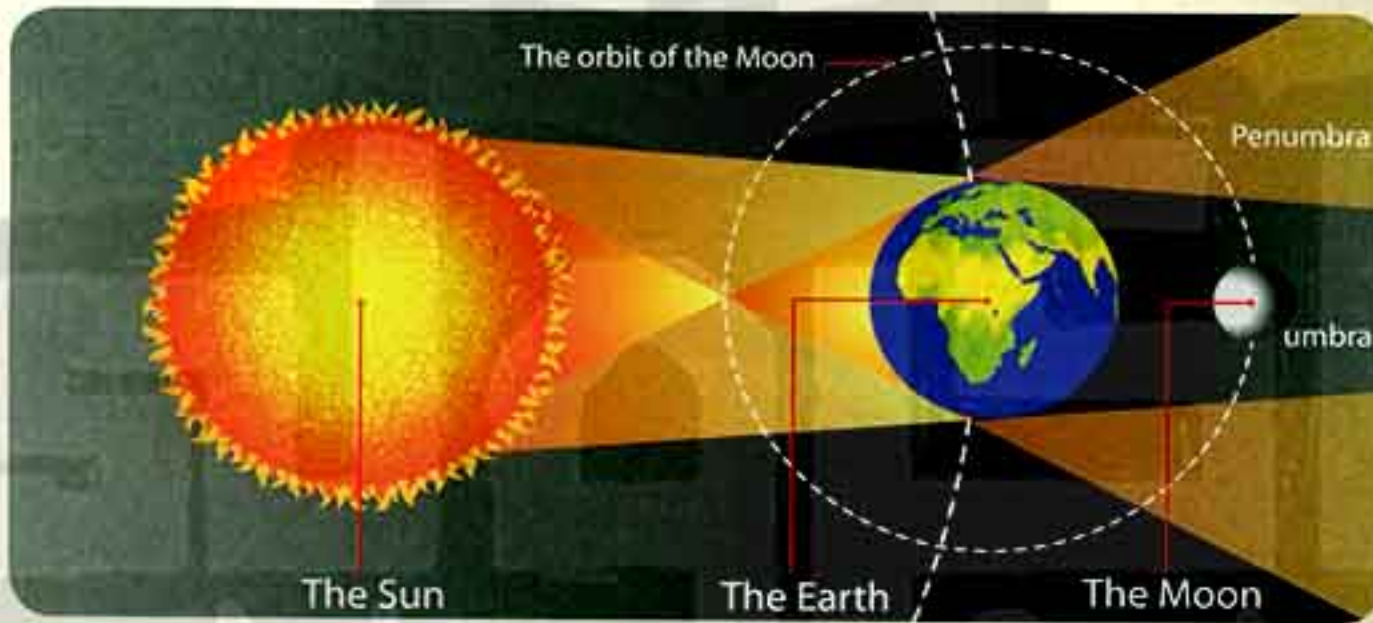
Lunar eclipse:

An astronomical phenomenon occurs when the Sun, the Earth and the Moon are on one straight line with the Earth in the middle hiding the sunlight from the Moon.

Types of lunar eclipse

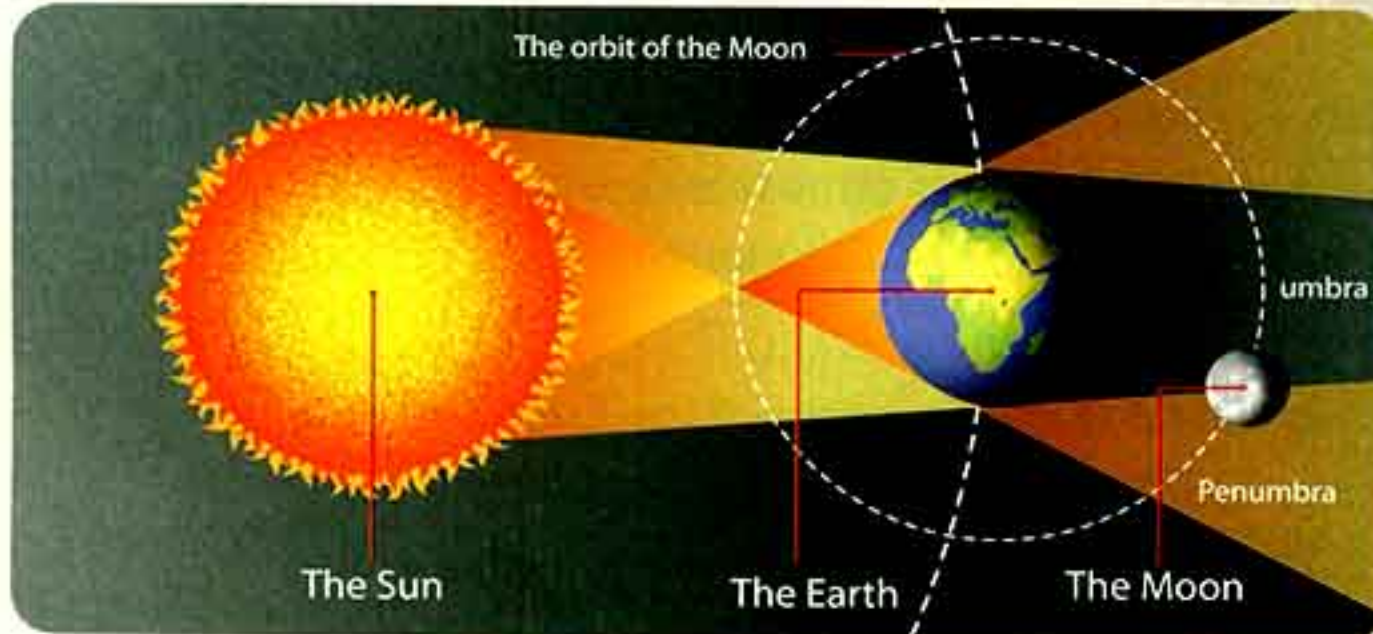
1. Total lunar eclipse

- When the whole Moon enters the shadow area of the Earth.
- The color of the Moon tends to be red during the start of the total lunar eclipse.
- We can't see the Moon completely.



2. Partial lunar eclipse

- When a part of the Moon enters the shadow area of the Earth.
- We can see a part of the Moon



- ▶ When the whole Moon enters the semi-shaded area (penumbra) of Earth, the Moon's color tends to be faint but this is not considered an eclipse.
- ▶ Lunar eclipse does not need safety precautions as it does not harm the eye.
- ▶ Lunar eclipse occurs twice per year and it may last up to two hours.

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Exercises on Lesson

2

Answer Guide P. 12

1 Choose the correct answer:


- Lunar eclipse occurs at the (Giza 2019)
 - middle of the lunar month
 - beginning of the lunar month
 - first 3 days of the month
 - end of the lunar month
- A total lunar eclipse occurs when (Alex. 2017)
 - the Moon is totally in the umbra area of the Earth
 - a part of the Moon is in the umbra area of the Earth
 - the Moon is totally in the penumbra area of the Earth
 - the Moon is totally in the extension of the cone shadow of the Earth
- When the whole Moon enters the shadow area of the Earth, (Giza 2019)
 - partial lunar eclipse happens
 - no eclipse happens
 - total lunar eclipse happens
 - no correct answers
- The Moon seems red when it is totally in the
 - umbra area of the Earth
 - penumbra area of the Earth
 - extension of the cone shadow of the Earth
 - no correct answers
- We see the Moon incomplete in the
 - partial lunar eclipse
 - total lunar eclipse
 - annular lunar eclipse
 - total solar eclipse
- eclipse is formed when the Moon totally enters the umbra area of the Earth. (South Sinai 2013)
 - Total lunar
 - Partial lunar
 - Total solar
 - no correct answers
- All the following are types of lunar eclipse except
 - annular eclipse
 - total eclipse
 - partial eclipse
 - no correct answers (Qalubia 2013)
- Lunar eclipse is formed when the Earth, the Sun and the Moon are on the same straight line with
 - the Earth lies between the Sun and the Moon
 - the Moon lies between the Earth and the Sun
 - the Sun lies between the Earth and the Moon
 - no correct answers (Giza 2014)

9. The Babylonians have discovered that the Moon returns to the same point of the lunar or solar eclipse after
a. 18 years and 11 days b. 11 years and 18 days
c. 7 years and 1 day d. no correct answers
10. The time taken by the solar eclipse is the time taken by the lunar eclipse. (Damietta 2018)
a. shorter than b. longer than c. equal to d. no correct answers
11. The lunar eclipse occurs times per year. (Cairo 2018)
a. one b. two c. three d. four
12. We can see the lunar eclipse when the Moon phase is
a. crescent b. 1st quadrature c. new Moon d. full Moon
13. During the start of the lunar eclipse, the color of the Moon tends to be
a. red b. orange c. yellow d. green
14. When the whole Moon enters the semi-shaded area of the Earth, the Moon light turns to be faint (Alex. 2018)
a. and solar eclipse occurs b. and partial lunar eclipse occurs
c. and no eclipse occurs d. and annular solar eclipse occurs
15. Lunar eclipse is originated in of the lunar month. (Cairo 2018)
a. beginning b. middle c. end d. quarter
16. happens to the Moon. (Cairo 2018)
a. Total solar eclipse b. Total lunar eclipse
c. Total and partial lunar eclipse d. Partial solar eclipse

2 Complete the following sentences:

1. Lunar eclipse phenomenon occurs when is located between and
(Dakahlia 2019)
2. The lunar eclipse occurs in the of the lunar month when the Moon phase is
(Giza 2018)
3. Lunar eclipse happens a year.
4. Total lunar eclipse occurs when the Moon falls in the area of the Earth. (Cairo 2018)
5. eclipse is formed when a part of the Moon enters the umbra of the Earth.
(Beheira 2019)
6. Lunar eclipse lasts for or

Lesson 2

7. Lunar eclipse can be seen in any place on the and when it starts the color of the moon tends to be (Kafr-El Sheikh 2019)
8. When the Sun, the Earth and the Moon lie on the same straight line with the Earth in the middle, is formed.
9. The duration of solar eclipse is about, while the duration of lunar eclipse is about (Alex. 2019)
10.  occurs when the comes between the Sun rays and a part of or the whole Moon. (Qalubia 2012)
11. The eclipse does not harm the eye, while harms the eye.
12. There are two types of lunar eclipses which are and (Beheira 2019)
13. When the Moon enters the semi-shaded area, it turns to be without forming (Ismalia 2018)
14. The color of the Moon tends to be during the start of lunar eclipse. (New Valley 2011)
15. is the lunar eclipse in which the whole Moon enters the umbra shadow of the Earth. (Dakahlia 2012)
16. We can see eclipse when the Sun is behind the horizon at night. (Gharbia 2018)
17. always occurs in the morning while occurs at night. (Giza 2018)
18. The lunar and solar eclipses are phenomenon. (Giza 2018)

3 Put (✓) in front of the right statement and (X) in front of the wrong one:

1. Lunar eclipse is a natural phenomenon that occurs when the Earth lies between the Sun and the Moon at the same straight line. ()
2. Partial lunar eclipse is a natural phenomenon that occurs when a part of the Moon lies in the shadow cone area of the Earth. ()
3. Partial lunar eclipse is a natural phenomenon where the Moon's color tends to be red. ()
4. Total lunar eclipse is a natural phenomenon when the whole Moon lies in the umbra area of the Earth. (Kafr El-Sheikh 2014) ()
5. Partial lunar eclipse is a natural phenomenon where the Moon seems incomplete. ()
6. The lunar eclipse occurs during day. (South Sinai 2016) ()
7. When the Moon is totally inside the umbra area of the Earth, partial lunar eclipse is formed. ()
8. The phenomena of solar and lunar eclipses attract people's attention because they affects life on Earth. (Cairo 2019) ()

9. 🌑 Lunar eclipse occurs when the Sun, the Earth and the Moon are all on a straight line with the Earth in the middle. ()
10. We use special glasses during observing lunar eclipse. (Sohag 2019) ()
11. 🌑 Looking directly at the lunar eclipse is harmful to the eye. (South Sinai 2014) ()
12. Lunar eclipse can be seen easily from the Earth's surface with the naked eye unlike the solar eclipse. (Qena 2014) ()
13. The duration of the lunar eclipse does not exceed seven minutes and few seconds. (Alex. 2014) ()
14. The phenomenon of the lunar eclipse occurs in the middle of the lunar month. (Sohag 2011) ()
15. We can notice more than one type of lunar eclipse. ()
16. In the start of the total lunar eclipse, the color of moon tends to be red due to the red rays that can't be absorbed from above the atmosphere of the Earth. (Cairo 2019) ()
17. When the whole the Moon enters the semi-shaded of Earth, the Moon seems without eclipse. ()
18. The lunar eclipse occurs at the end of the lunar month. (Cairo 2019) ()

4 Write the scientific term for each of the following:

1. A natural phenomenon that occurs when a part of the Moon enters the shadow area of the Earth. (Port Said 2019) (.....)
2. The natural phenomenon in which the Moon seems as a circle whose color tends to be red. (Menofia 2016) (.....)
3. The lunar eclipse in which the whole Moon lies in the umbra area of the Earth. (Ismalia 2018) (.....)
4. A natural phenomenon that occurs in the middle of the lunar month at a rate of two times per year. (Beni Suef 2018) (.....)
5. The type of eclipse that can be seen at night only and lasts for two hours. (Damietta 2011) (.....)
6. 🌑 A phenomenon that occurs when the Sun, the Earth and the Moon are all on one straight line the Earth in the middle. (Beni Suef 2013) (.....)
7. Rays that cannot be absorbed from above the atmosphere to the Earth and cause the red color of the Moon in the start of the total lunar eclipse. (Giza 2018) (.....)
8. The phenomenon that can be seen from any place on the Earth when the Sun is behind the horizon at night. (Gharbia 2018) (.....)

Lesson 2

9. The area that appears between the lighted area and the real shadow area and we can see a part of the lighted source if we stand in this area. (Port Said 2017) (.....)
10. It occurs when the whole Moon enters the shadow area of the Earth. (Cairo 2019) (.....)
11. The eclipse which doesn't require precautions to look at it. (Giza 2018) (.....)
12. An area that if the whole Moon is located in, there will be no eclipse. (Alex. 2019) (.....)
13. The area that lies between the red shadow area and the lighted area. (Alex. 2018) (.....)

5 Correct the underlined word in each of the following:

1. The time of the lunar eclipse may last for more than two days. (Ismailia 2017) (.....)
2. The lunar eclipse occurs at a rate of two times per month. (Beheira 2019) (.....)
3. Total lunar eclipse occurs when the Moon lies totally in the penumbra area of the Earth. (.....)
4. At the beginning of the total lunar eclipse, the Moon's color tends to be yellow. (Alex. 2019) (.....)
5. Lunar eclipse is formed in the middle of the lunar month twice a month. (.....)
6. Lunar eclipse occurs at the end of the lunar month. (Cairo 2018) (.....)
7. Solar eclipse occurs when the Earth lies between the Sun and the Moon. (Kafr-El Sheikh 2019) (.....)
8. Lunar eclipse requires special devices to watch it. (.....)
9. Lunar eclipse occurs in the middle of the year when the Earth lies between the Sun and the Moon. (.....)
10. Lunar eclipse occurs when the Moon lies between the Earth and the Sun on the same straight line. (.....)
11. The time taken by the solar eclipse equals that taken by the lunar eclipse. (.....)

6 Give a reason for each of the following:

1. The occurrence of the total lunar eclipse.
-

2. The occurrence of the partial lunar eclipse.
.....
3. Lunar eclipse can be seen easily from the Earth's surface.
.....
4. The effect of the lunar eclipse on the eye differs from that of the solar eclipse.
.....
5. There is no annular lunar eclipse. (Alex. 2019)
.....
6. The Earth has an important role in the lunar eclipse.
.....
7. 🍰 The phenomena of the solar and the lunar eclipses are considered applications of the umbra phenomenon. (Beheira 2013)
.....
8. 🍰 The phenomena of the lunar and the solar eclipses are repeated regularly and can be predicted.
.....
9. The lunar eclipse does not require precautions or special devices to observe it. (Port Said 2017)
.....
10. The Moon is colored in red at the start of the total lunar eclipse. (Port Said 2018)
.....

7 What happens in the following cases?

1. The Moon is totally in the cone shadow area of the Earth. (South Sinai 2016)
.....
2. A part of the Moon lies in the cone shadow of the Earth. (Beheira 2017)
.....
3. When the Moon is totally found in the penumbra area of the Earth.
.....
4. The Earth comes between the Moon and the Sun and they are all on one straight line. (Sohag 2019)
.....
5. When the Moon completely enters the semi-shaded area of the Earth. (Giza 2019)
.....

Lesson 2

8 Define:

1. 🌑 Total lunar eclipse.

.....

.....

2. Partial lunar eclipse.

.....

.....

9 Compare between the solar eclipse and lunar eclipse in the following table:

P.O.C	Solar eclipse	Lunar eclipse
Reasons
Harm

10 Mention one difference between total lunar eclipse and partial lunar eclipse.

(Port Said 2015)

.....

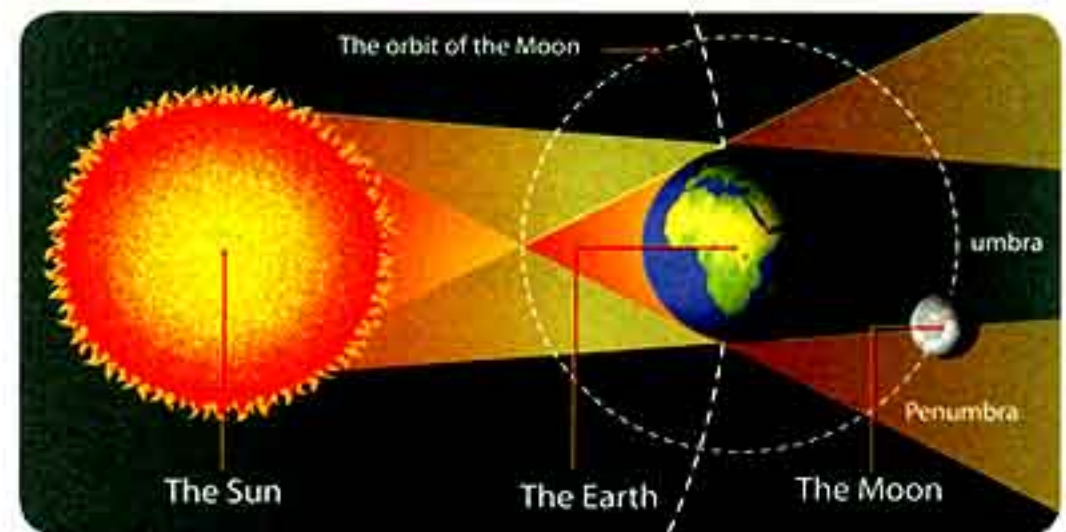
.....

.....

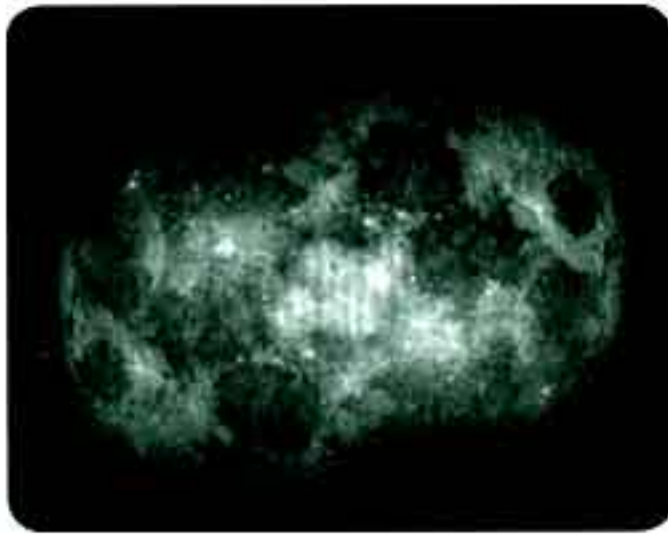
11 🌑 Mention the type of the eclipse in the following figures:



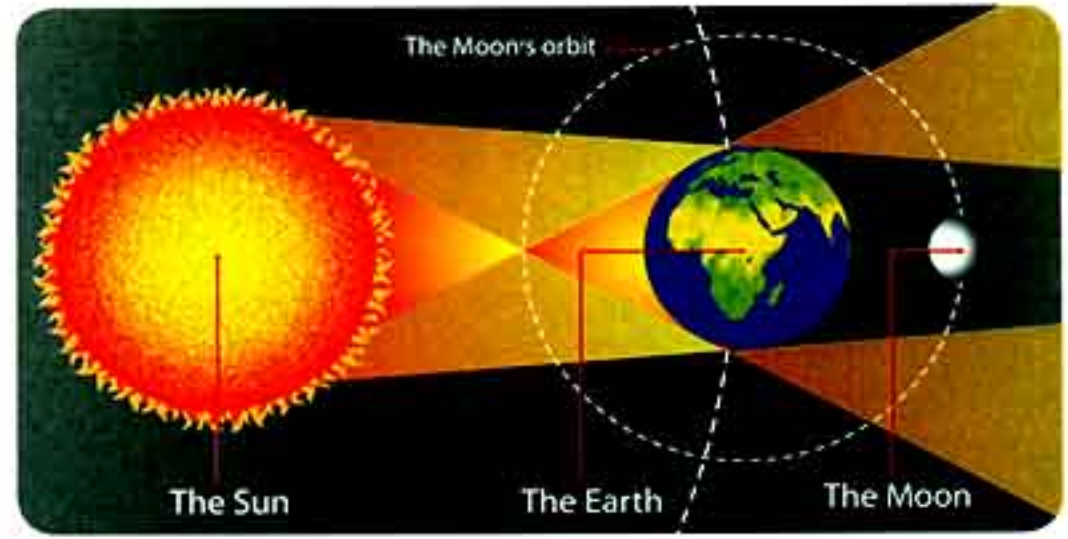
1. This indicates eclipse.



2. This indicates eclipse.



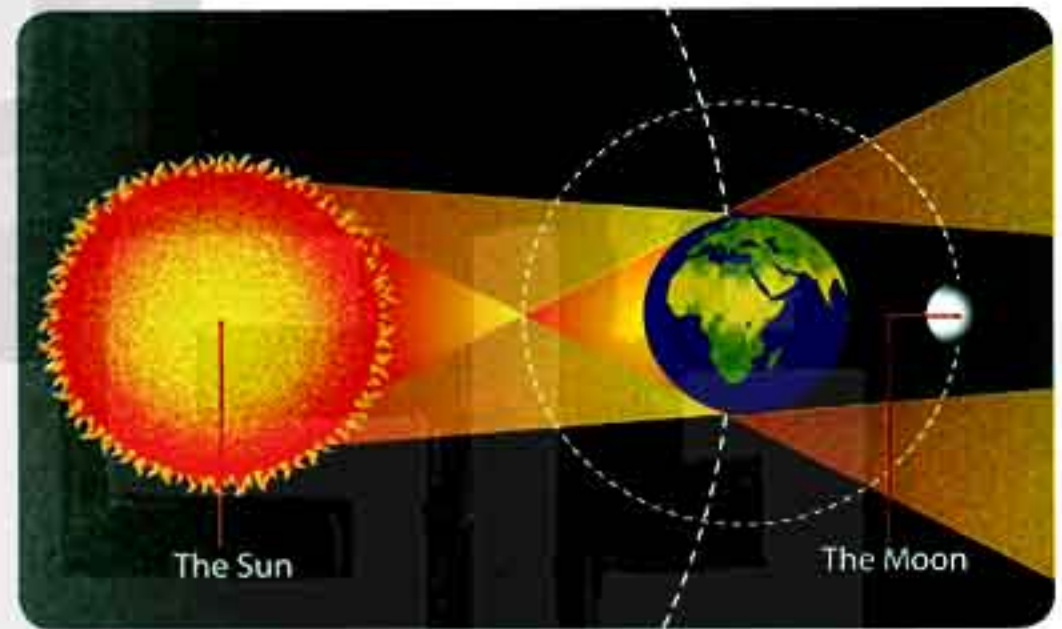
3. This indicates eclipse.



4. This indicates eclipse.

12 The following figure represents lunar eclipse phenomenon, observe it, then answer the questions: (Gharbia 2016)

1. What is the name of the astronomical phenomenon shown in the opposite figure?
2. What happens when ...?
 - (a) the whole Moon enters the penumbra area
 - (b) the whole Moon enters the umbra area



13 Mention the similarities between solar and lunar eclipses. (Giza 2015)

.....

.....

.....



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Lesson 2

TIMSS

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2

on Lesson

Answer Guide P. 13

1. Some students had a discussion about the lunar eclipse:

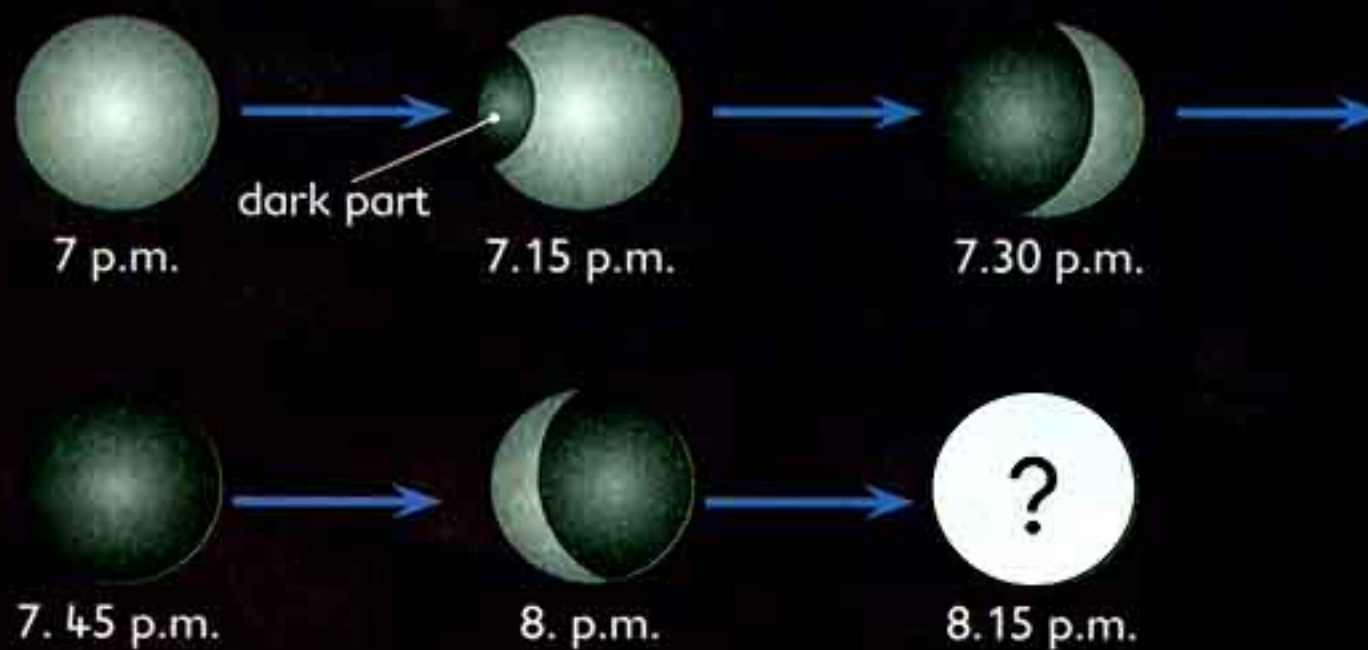


a. Correct the wrong statements if they need.

b. Which statement describes the reason for the red color of the Moon?

c. Your country will witness a lunar eclipse, which advice will you follow and why?

2. The following drawings show an eclipse of the Moon, from 7 p.m. to 8 p.m. Draw what you predict the Moon will look like at 8.15 p.m.



Unit 4

Structure and Function of Living Organisms



Lesson 1 Absorption and transmission of water and mineral salts in plants

Objectives:

- Identifying the role of root hairs in the absorption of water and mineral salts from the soil.
- Identifying the transmission of water and dissolved substances in plants.
- Identifying the transpiration process in plants.
- Carrying out experiments to identify the transpiration process in plant.

Summary

- ▶ The plant consists of two main parts which are **root system** and **shoot system**.
- ▶ The plant makes its own food by a process known as **photosynthesis process**.

Water + mineral salts + carbon dioxide gas $\xrightarrow[\text{light}]{\text{sun}}$ food + oxygen

The root system consists of:

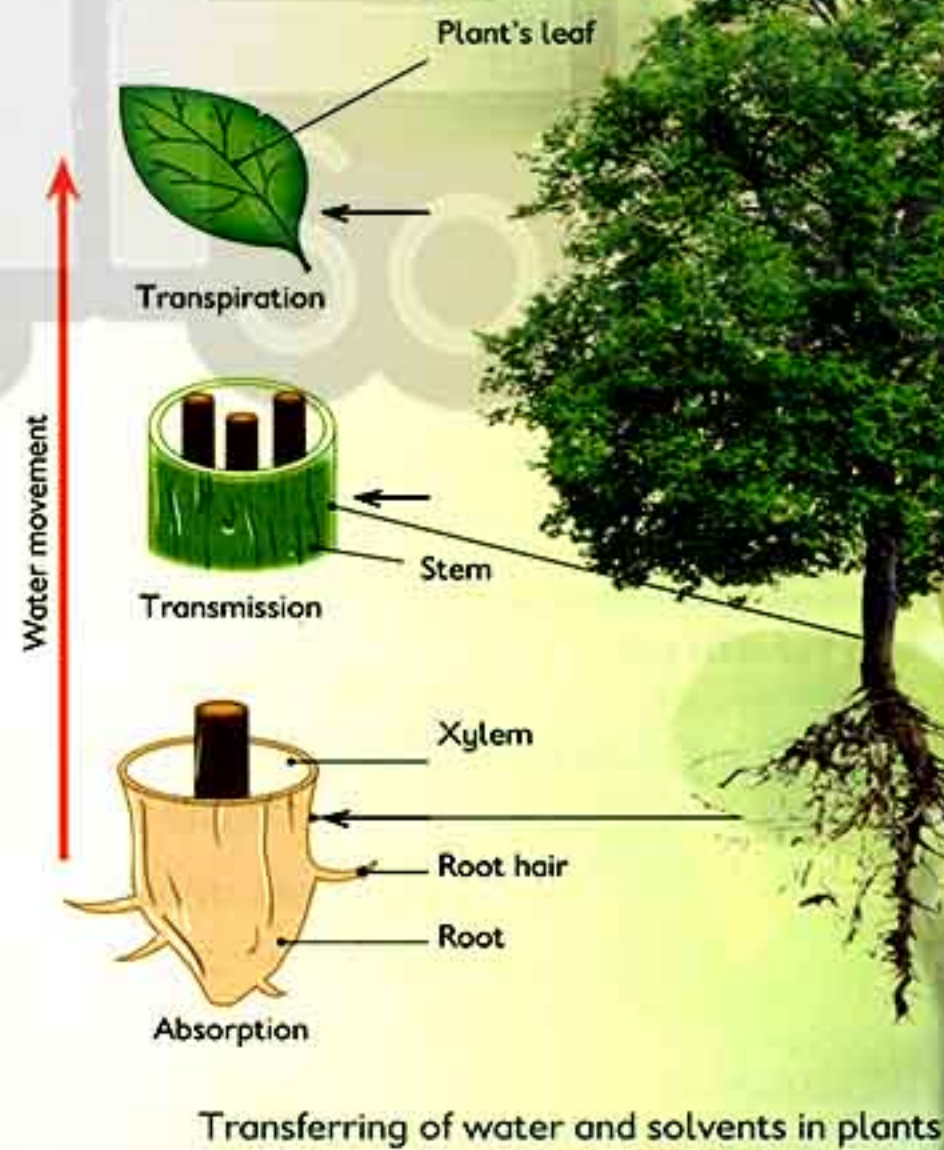
- 1 Epidermis layer
- 2 Cortex
- 3 Xylem
- 4 Pith

Transport of water and minerals:

Water evaporates from the stomata openings that spread over the leaves through transpiration process.

Water and mineral salts transfer from the root to the stem through the xylem and then to the leaves.

Root hairs absorb water and mineral salts from the soil and transfer it to the xylem inside the root.



GEM

Exercises on Lesson

1

Answer Guide P. 14

1 Choose the correct answer:

- The plant makes its own food by
a. respiration b. photosynthesis c. digestion d. sensation
-  The plant absorbs water by
a. flowers b. stem c. leaves d. root hairs
- The root system consists of
a. cortex b. epidermis c. xylem and pith d. all the previous
- The last row of the cortex layer is called
a. epidermis b. xylem c. endodermis d. pith
- The root hairs extend from the cells of the layer.
a. epidermis b. cortex c. endodermis d. xylem
- is responsible for the photosynthesis process. (Port Said 2017)
a. Root system b. Shoot system c. (a) and (b) d. Cytoplasm
- Water transfers from the root to the stem through the layer.
a. cortex b. epidermis c. endodermis d. xylem
- absorb water and mineral salts from the soil. (Aswan 2016)
a. Leaves b. Root hairs c. Stems d. Buds
- The cell membrane of the plant's root hair is characterized by (Gharbia 2017)
a. photosynthesis b. selective permeability
c. transpiration d. evaporation
- The plant gets mineral salts through (Ismailia 2017)
a. selective permeability property b. osmosis property
c. imbibition d. transpiration
- Water is transferred from the plant's stem to the leaves through
a. endodermis b. xylem vessels c. stomata d. endodermis

Lesson 1

12. Among the functions of the endodermis is the
 a. absorption of water from the soil
 b. carrying out transpiration process
 c. regulating the passing of water to the xylem
 d. (a) and (b)
13. The concentration of the salt solution inside the vacuole is the concentration of the salt solution inside the soil.
 a. less than b. more than c. equal to d. no correct answers
14. Transpiration is a (bio) process by which the plant is water.
 a. absorbing b. imbibing c. losing d. (a) and (b) and (c)
15. ☀ Losing water from plant is called process. (South Sinai 2016)
 a. photosynthesis b. transpiration c. evaporation d. osmosis
16. Each stoma is surrounded by two cells.
 a. animal b. guard c. absorbing d. leaf
17. ☀ The stoma in a plant is surrounded by guard cells. (Suez 2013)
 a. two b. three c. four d. five
18. The selective permeability of the plant's root allows (Beni-Suef 2013)
 a. the losing of water in the form of water vapor from the plant.
 b. the absorbing of water from soil.
 c. the passing of some salts only according to the needs of the plant.
 d. the respiration process.
19. of the root hair membrane allows only some salts to pass through according to the need of the plant. (6th October 2011)
 a. Osmosis b. Selective permeability
 c. Evaporation d. Respiration

2 Complete the following sentences:

1. Plants make their own food during process.
2. The plant takes from air, and water from the soil and it makes its own food in the presence of sunlight during process. (Menofia 2011)

3. Plants get and from the soil.
4. and are examples of mineral salts needed by the plant.
5. Plants absorb gas to carry out photosynthesis process and produce gas.
6. The shoot system in the plant consists of,, fruits and
7. The root system is subdivided and extended through the soil to the plant. (Suez 2011)
8. The outer layer of root is called, while the innermost layer is called
9. Root hairs extend from the and are lined from inside with a thin layer of (Alex. 2016)
10. Root hairs absorb water from the soil by the property of
11. The feature by which some mineral salts pass to the plant according to its needs is known as (Aswan 2011)
12. Water and mineral salts are transferred to the stem through
13. The concentration in the vacuole is than the concentration of salt solution in the soil. (6th October 2011)
14. The transmission of water from soil to the vacuole of the root hairs occurs by feature while mineral salts are transmitted from soil by (Damietta 2017)
15. Transpiration is the loss of in the form of
16. The process that allows some salts to pass according to the plant's needs is called (Aswan 2011)
17. 🍷 The cell membrane of the root hair has property which allows some salts to pass through. (Cairo 2017)
18. 🍷 The in plant is surrounded by two guard cells. (Sohag 2017)
19. 🍷 On both surfaces of most plants' leaves, there are tiny holes which are called through which process takes place. (Fayoum 2013)
20. Plant carries out to get rid of excess water.
21. Stomata are found in large numbers on the surface of the leaf. (Beheira 2012)

Lesson 1

22. control the closing and opening of the stomata.
23. in plants are surrounded by two guard cells.
24. The plant loses some of its water through which are spread on the plant's leaves in a process that is called (Giza 2012)
25. Each stoma is surrounded by cells that change their shapes to close and open the stoma. (Qalubia 2013)
26. The is widespread on the lower surface of the leaves. (Kafr El Sheikh 2017)

3 Put (✓) in front of the correct statement and (X) in front of the incorrect one:

1. Green plants need light, water and carbon dioxide to make (Cairo 2017) ()
photosynthesis process by the root system.
2. The outer layer of the root of the plant is called xylem. ()
3. The root extends and penetrates the soil to absorb water. ()
4. The plant absorbs water and minerals from the air. ()
5. The root system in plants is responsible for photosynthesis process. (Beheira 2012) ()
6. The cell membrane of the root hair has the osmosis property which allows only some salts to pass through. (Fayoum 2012) ()
7. The endodermis layer regulates the passing of water to the xylem. (Qena 2016) ()
8. Xylem vessels transfer water and salts in the plant. ()
9. The cell membrane has selective permeability feature for salts. ()
10. The salt solution concentration inside a vacuole of root hair is less than the salt concentration inside the soil. (Cairo 2016) ()
11. Plants absorb water and mineral salts from the soil by root hairs. (Cairo 2013) ()
12. Respiration process helps in raising water and salts up the plant. (Suez 2012) ()
13. Transpiration is the losing of water in the form of water vapor from the leaf. ()
14. ☀ The osmosis property is a biological process by which the plant loses water in the form of water vapor. (Red Sea 2013) ()
15. ☀ The stoma is widely spread on the upper surface of the plant's leaves. (South Sinai 2013) ()


16. Transpiration helps raising water and salts through xylem vessels from the root to the stem, then to the leaves. ()
17. Transpiration is a vital process by which the plant loses excess water. ()
18. 🌱 Stoma in plants is surrounded by two woody cells. (Aswan 2013) ()
19. 🌱 Each stoma in the plant is surrounded by guard cells that change their shape to open and close the stoma. ()

4 Write the scientific term for each of the following:

- The vital process carried out by the plant to produce its own food. (.....)
- 🌱 The part of the plant that penetrates the soil particles and fixes it. (Assuit 2017) (.....)
- The property that allows the membrane of root hairs to pass only the salts that are needed to the plant. (.....)
- The feature by which water and mineral salts are transferred from the soil through semi-permeable membrane of the root hair. (Cairo 2011) (.....)
- The losing of water in the shape of water vapor from the plant leaves. (Cairo 2017) (.....)
- Two cells surrounding the stoma, each changes its shape to open and close the stoma. (Damietta 2016) (.....)
- 🌱 They are tiny holes found on the surface of the leaf. (Giza 2013) (.....)
- The transferring of water from an area of high concentration of water to an area of low concentration of water through a semi-permeable membrane. (Gharbia 2017) (.....)
- Small holes that are widely spread on the lower surface of the leaf. (Minia 2011) (.....)
- 🌱 The process by which plants lose the excess water. (.....)



Lesson 1

5 Correct the underlined words:


1. The plant loses water in the form of water vapor during photosynthesis process. (.....)
2. Leaves extend in the soil and penetrate it to increase the surface area of absorption. (.....)
3. Plants carry out photosynthesis process to get rid of excess water. (.....)
4. Oxygen gas is produced during respiration process in the plant. (.....)
5. Plant absorbs nitrogen gas during photosynthesis process. (.....)
6.  Plants' roots are surrounded by two guard cells. (.....)
7. Salt solution concentration inside the nucleus of the root hair is more than that in the soil. (.....)
8. Stomata are found in large numbers on the upper surface of the leaf of the plant. (.....)
9. Stomata are found in large numbers on the plant's stem. (.....)
10. Transpiration is losing of water in the shape of water droplets. (.....)

(Menofia 2016)


6 Give a reason for each of the following:

1.  Plants' roots branch and extend through the soil particles. (Menofia 2011)
.....
2. The cell membrane of root hairs has a selective permeability property.
.....
3. The presence of highly concentrated sap vacuole in root hairs.
.....
4.  Root hairs can absorb water from the soil. •
.....
5. Water rushes from the soil into root hairs through its semi-permeable membrane. (Sharkia 2011)
.....
6. The concentration of salt solution inside the vacuole is greater than the concentration of salt solution in the soil. (Beheira 2012)
.....


7.  Each stoma is surrounded by two guard cells. (Alex. 2013)

8.  The presence of stomata openings on the lower surface of the plant leaves. (Damietta 2013)

7 What happens in the following cases?

1.  The concentration of soil solution is higher than the concentration of the solution inside the root hairs.

2. Covering a green potted plant with a black bag.

3.  The absence of stomata on the leaves of plants. (Aswan 2016 2012)

4.  There is no osmosis feature in the plant. (Port Said 2017)

5. The concentration of the solution decreases inside the sap vacuole of root hairs. (Damietta 2017)

6. The absence of guard cells which surround the stomata in the plant's leaf. (Assuit 2017)

7. The cell membrane of the root hairs of the plant is not found. (Qalubia 2012)

8 Mention one function, advantage or disadvantage for each of the following:

1. The root system of the plant. (Beni Suef 2013)

 Endodermis cells in the plant.

3. The guard cells in the plants' leaves. (Damietta 2017)

4. Stomata. (Port Said 2017)

Lesson 1

5. Mineral salts in the soil.

.....

6. Transpiration process.

.....

9 Compare between:

1. Photosynthesis process and transpiration process.

Photosynthesis process	Transpiration process
.....
.....
.....

2. Osmosis property and selective permeability.

Osmosis property	Selective permeability
.....
.....
.....

3. The root system and the shoot system.

The root system	The shoot system
.....
.....
.....

10 Re-arrange the layers of the root from inside to outside:

(Xylem – Pith – Epidermes – Cortex – Endodermis)

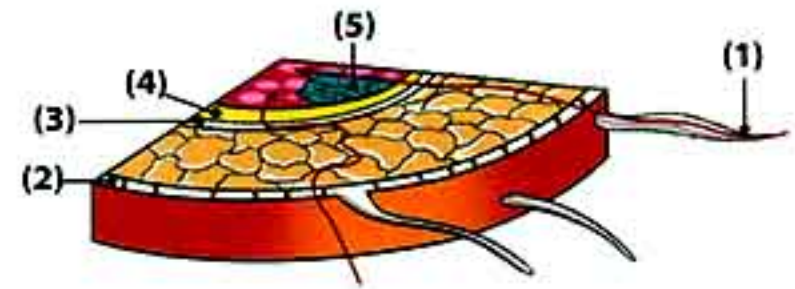
.....

.....

.....

11 Look at the following figure, write down the labels on the drawing:

1.
2.
3.
4.
5.



12 Look at the following figures that show the structure of stomata:

(a) Label the figures:

1.
2.

(b) Fig. (a) represents

Fig. (b) represents



Fig. (a)

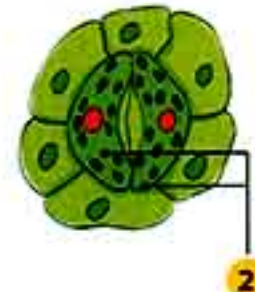


Fig. (b)

(Sohag 2012)

13 Explain by an activity the transpiration process in the plants.

.....

.....

.....

.....

.....



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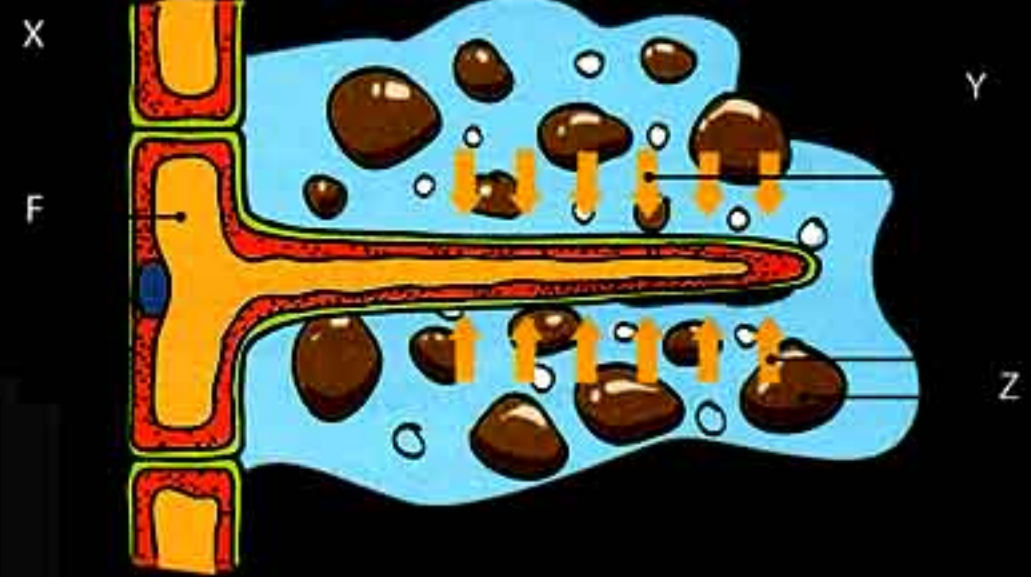
on Lesson

Answer Guide P. 15

1. Examine the figure:

a. Name the following parts:

- X.
- F.
- Y.
- Z.



b. (i) Mention the function of this cell.

(ii) Describe one feature shown in the diagram that is an adaptation for this function.

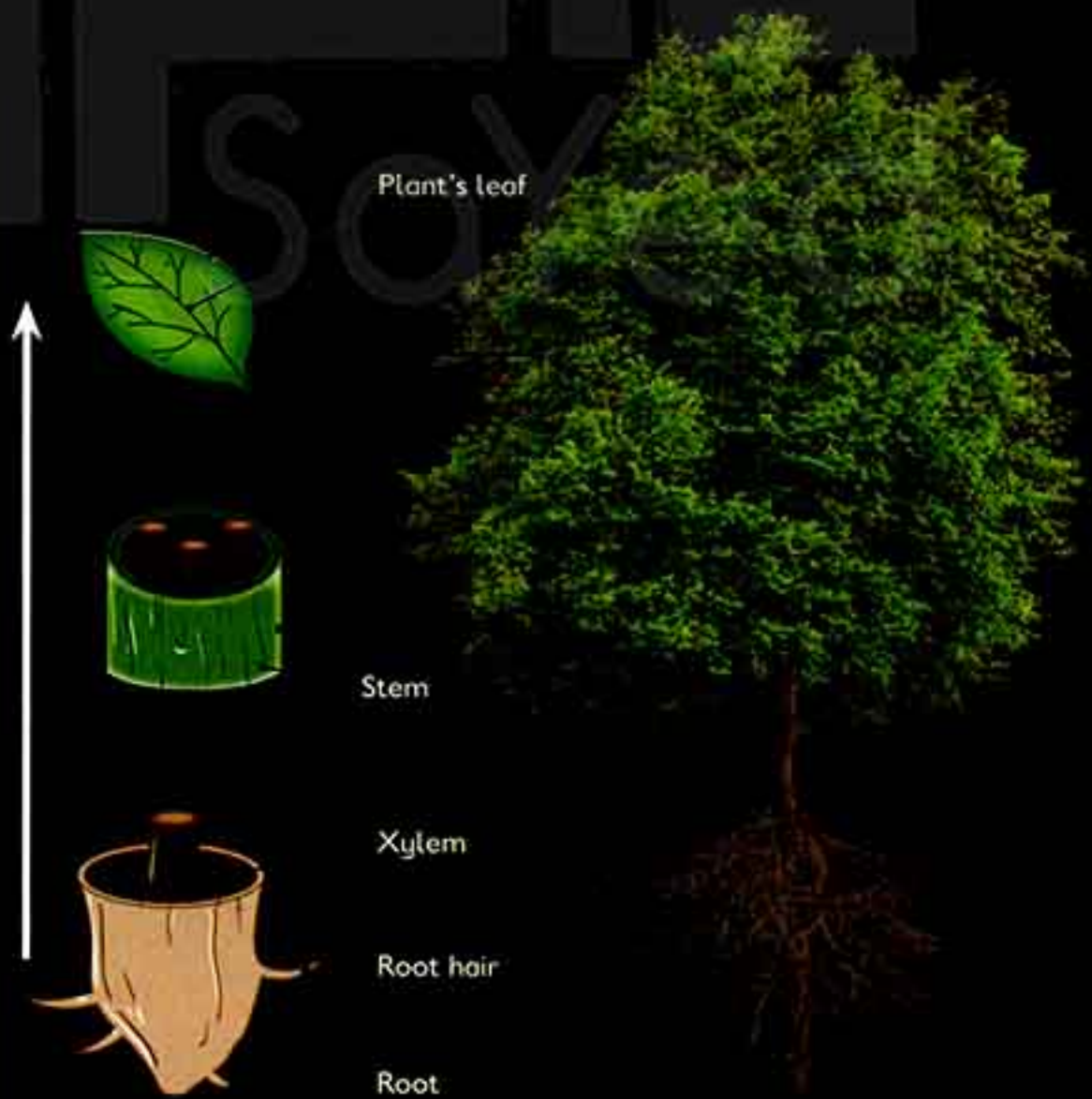
2. Examine the following figure:

• Fill in the boxes to show the water uptake:

3

2

1



Unit 1

Force and Motion

Remember what you have learnt in this unit through the following points:

- 1 Definitions
- 2 Give a reason for each of the following
- 3 Comparisons
- 4 What happens if ...?
- 5 Determine the function of each of the following
- 6 Diagrams

1. Definitions:

Term	Definition
Lever	<ul style="list-style-type: none"> It is a rigid bar (straight or curved) that rotates around a fixed point called fulcrum and is also affected by effort force and resistance force.
Fulcrum (O)	<ul style="list-style-type: none"> The fixed point which the lever rotates around.
Effort force (F)	<ul style="list-style-type: none"> The force exerted by a person to equilibrate the resistance.
Resistance force (R)	<ul style="list-style-type: none"> The force that results from the weight of the body that we want to move.
Arm of force	<ul style="list-style-type: none"> The distance between the effort force and the fulcrum.
Arm of resistance	<ul style="list-style-type: none"> The distance between the resistance and the fulcrum.
First class levers	<ul style="list-style-type: none"> The levers in which the fulcrum lies between the effort force and the resistance.
Second class levers	<ul style="list-style-type: none"> The levers in which the resistance lies between the effort force and the fulcrum.
Third class levers	<ul style="list-style-type: none"> The levers in which the effort force lies between the resistance and the fulcrum.

2. Give a reason for each of the following:

- Crowbar is a lever.
 - As it is a rigid bar that has a fulcrum, effort force and resistance force.
- Seesaw and balance are first class levers.
 - As the fulcrum lies between the effort force and the resistance force.
- Wheelbarrow is a second class lever.
 - As the resistance lies between the effort force and the fulcrum.
- Sweet holder and tweezers are third class levers.
 - As the effort force lies between the fulcrum and the resistance force.

General & Final Revision

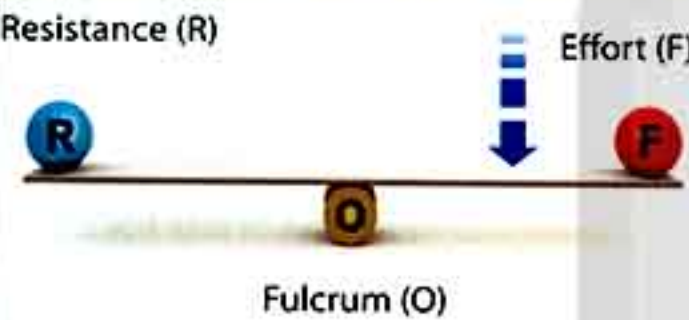
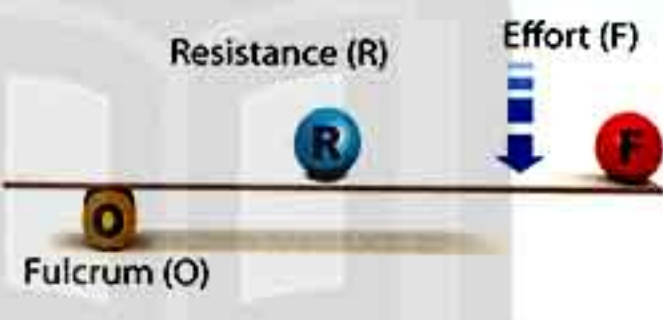
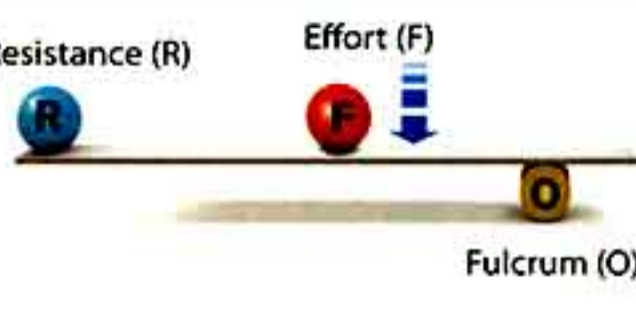
5. Some levers have more than one function.
 - As some levers are used to increase force and increase distance.
6. Levers have great importance in our life.
 - As they make work easier.
7. Doctors and watchmakers use tweezers as a lever.
 - As they are used to pick up very small objects.
8. First class levers sometimes save effort and sometimes do not.
 - When the arm of force is longer than the arm of resistance, they save effort but when the arm of force is smaller than the arm of resistance, they don't save effort.
9. Second class levers always save effort.
 - Because the arm of force is always longer than the arm of resistance so the effort force is smaller than the resistance force.
10. Third class levers don't save effort.
 - Because the arm of force is always shorter than the arm of resistance.
11. The force may be equal to the resistance in first class levers.
 - Because the arm of force is equal to the arm of resistance.
12. Crowbar conserves effort.
 - Because the force arm is longer than the resistance arm.
13. In second class levers, the force is always less than the resistance.
 - Because the arm of force is always longer than the arm of resistance.
14. Wheelbarrow has mechanical benefits.
 - Because the force arm is longer than the resistance arm.
15. Manual broom doesn't have mechanical benefits.
 - Because the force arm is shorter than the resistance arm.
16. In the stapler, the effort force is smaller than the resistance force.
 - Because the effort arm is longer than the resistance arm.

17. Some of the levers are important to man although they do not conserve effort.

- Because they are important in other things such as: (increasing distance, increasing speed, avoiding dangers and being accurate in performance).

3. Comparisons:

1. Compare between first, second and third class levers:

1 First class levers	2 Second class levers	3 Third class levers
 <p>Resistance (R)</p> <p>Effort (F)</p> <p>Fulcrum (O)</p>	 <p>Resistance (R)</p> <p>Effort (F)</p> <p>Fulcrum (O)</p>	 <p>Resistance (R)</p> <p>Effort (F)</p> <p>Fulcrum (O)</p>
<p>Definition:</p> <p>The levers where the fulcrum lies between the effort force and the resistance force.</p>	<p>Definition:</p> <p>The lever where the resistance force lies between the effort force and the fulcrum.</p>	<p>Definition:</p> <p>The lever where the effort force lies between the resistance force and the fulcrum.</p>
<p>Examples:</p> <p>Scissors, seesaw, balance, pliers and suction pump.</p>	<p>Examples:</p> <p>Wheelbarrow, nutcracker and bottle opener.</p>	<p>Examples:</p> <p>Tweezers, hockey bat, coal holder, fishing hook and manual broom.</p>
<p>Saving effort</p> <p>Some of them save effort, but others do not.</p>	<p>Saving effort</p> <p>Save effort.</p>	<p>Saving effort</p> <p>Don't save effort.</p>

General & Final Revision

2. Compare between the three types of levers:

P.O.C.	First class levers	Second class levers	Third class levers
Definition	<ul style="list-style-type: none"> They are levers where the fulcrum lies between the resistance force and the effort force. 	<ul style="list-style-type: none"> They are levers where the resistance force lies between the fulcrum and the effort force. 	<ul style="list-style-type: none"> They are levers where the effort force lies between the fulcrum and the resistance force.
The locations of F, O, R:	<ul style="list-style-type: none"> The fulcrum (O) is located between the effort force (F) and the resistance force (R). 	<ul style="list-style-type: none"> The resistance force (R) is located between the fulcrum (O) and the effort force (F). 	<ul style="list-style-type: none"> The effort force (F) is located between the resistance force (R) and the fulcrum (O).
Effort force arm and resistance arm	<ul style="list-style-type: none"> The effort force arm may be longer, smaller or equal to the resistance arm. 	<ul style="list-style-type: none"> The effort force arm is always longer than the resistance arm. 	<ul style="list-style-type: none"> The resistance arm is always longer than the effort force arm.
Saving effort	<ul style="list-style-type: none"> Some of them save effort, but the others don't save effort. 	<ul style="list-style-type: none"> They always save effort. 	<ul style="list-style-type: none"> They always do not save effort.
Benefits	<ul style="list-style-type: none"> Some of them have mechanical benefits, but the others have other benefits like increasing speed, distance, etc. 	<ul style="list-style-type: none"> All of them have mechanical benefits as they save effort. 	<ul style="list-style-type: none"> They are used to increase speed and distance. They are used to avoid dangers.
Examples	<ul style="list-style-type: none"> Crowbar, pliers, pincers and scissors. 	<ul style="list-style-type: none"> Bottle opener, Wheelbarrow and nutcracker. 	<ul style="list-style-type: none"> Ice holder, fishing hook and manual broom.

4. What happens if ...?

1. Man couldn't invent levers.
 - Our life would be hard and we would face many dangers.
2. The fulcrum lies between the effort force and the resistance force.
 - The lever is a first class lever and sometimes saves effort.
3. The force lies between the fulcrum and the resistance force.
 - The lever is a third class lever and never saves effort.
4. The resistance lies between the effort force and the fulcrum.
 - The lever is a second class lever and always saves effort.
5. The arm of force is longer than the arm of resistance.
 - The exerted force will be less than the resistance, so the lever saves effort.
6. The arm of resistance is longer than the arm of force.
 - The force exerted will be more than the resistance, so the lever does not save effort.
7. The arm of force is equal to the arm of resistance.
 - The exerted force is equal to the resistance so the lever does not save effort.

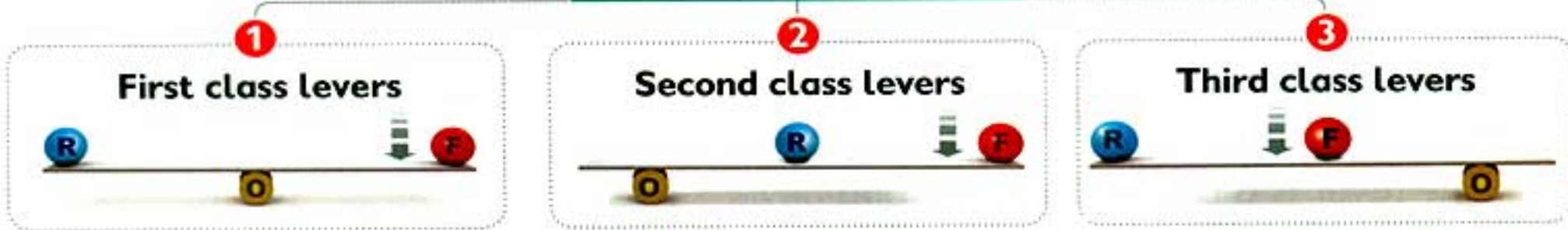
5. Determine the function of each of the following:

1. Crowbar	• It increases force.
2. Coal holder	• It helps us avoid dangers as it protects our hands from being burnt.
3. Nutcracker	• It increases force as it cracks the nuts easily.
4. Manual broom	• It transfers force and increases distances which helps in cleaning the floors.
5. Hockey bat	• It increases the speed of the ball.
6. Tweezers	• They provide accuracy in performance as they pick up small objects.

6. Diagrams:

- Levers are divided into three types according to the location of the effort force, the resistance force and the fulcrum:

Types of levers



Examples of the 1st Class Levers



- This type of levers is considered the most popular type in our daily life.

Examples of the 2nd Class Levers

Nutcracker



Wheelbarrow

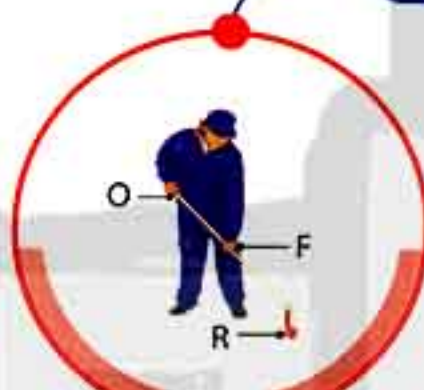


Lemon squeezer



Bottle opener

► The resistance force is between the fulcrum and the effort force.

Examples of the 3rd Class Levers

Manual broom



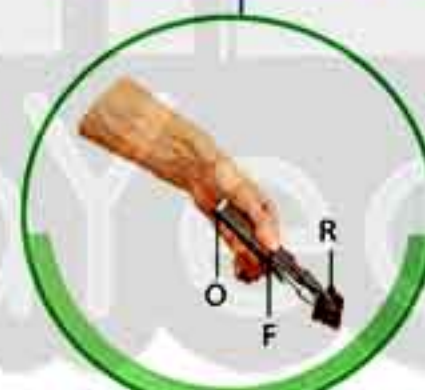
Hockey bat



Ice holder



Fish hook



Coal holder



Tweezers



Stapler



Sweet holder

► The effort force is between the fulcrum and the resistance force.

Unit 2

Electric Energy

Remember what you have learnt in this unit through the following points:

- | | |
|---|--|
| 1 Definitions | 4 What happens if ...? |
| 2 Determine the function of each of the following | 5 Comparisons |
| 3 Give a reason for each of the following | 6 What is the harm of each of the following? |
| | 7 Diagrams |

1. Definitions:

Term	Definition
Electric lamp	• A device used to change electric energy into light energy.
Electric bulb (with filament)	• A lamp whose idea depends on heating and glowing of the filament using electricity.
Fluorescent	• A lamp whose idea depends on light emission when passing an electric current through gas.
Simple electric circuit	• It is a closed path through which the electric current passes.
Electric current	• Moving electric charges.
Connecting lamps in series	• Connecting several lamps one after the other in one route.
Connecting lamps in parallel	• Connecting several lamps (in branching routes) so that the end of each lamp is connected to the end of the battery forming several paths for the electric current.
Good conductors of electricity	• Substances that allow electric current to pass through.
Electric insulators	• Substances that do not allow electricity to pass through (bad conductors of electricity).
Electric fires	• Electric fires mainly happen as a result of increasing the temperature of electric machines or wires.
Electric shock	• It is one of the dangers of electricity that results from passing of an electric current through the human body.
Electric burns	• Damage resulting from electricity that causes damage to the body tissues.

2. Determine the function of each of the following:

Item	Function
1. The light bulb base	<ul style="list-style-type: none"> It connects the light bulb to electricity. It carries the light bulb in upright position.
2. Glass bulb	<ul style="list-style-type: none"> It prevents the atmospheric air from reaching the filament thus increasing its lifetime and protecting it from burning.
3. Copper and lead wires	<ul style="list-style-type: none"> They connect electricity to the filament so it lights.
4. Argon gas	<ul style="list-style-type: none"> It is an inert inactive gas that prevents the burning of the filament.
5. The tungsten wire in the electric bulb	<ul style="list-style-type: none"> It is used in making the filament of the electric lamps which has a high melting point.
6. The fluorescent lamp	<ul style="list-style-type: none"> A source of light in houses, companies and advertising boards.
7. Electric insulators	<ul style="list-style-type: none"> They are used in making the handles of the electric tools and covering power cables.
8. Connecting lamps in parallel	<ul style="list-style-type: none"> It does not affect the light intensity of the electric lamps. When one of the lamps is damaged other lamps do not get affected.
9. The phosphoric substance in the fluorescent lamp	<ul style="list-style-type: none"> It shines with bright light from the fluorescent lamp.
10. The base of the light bulb :	<ul style="list-style-type: none"> It carries the light bulb upright and connects the light bulb to the electric circuit.
11. Points of connection in fluorescent lamp:	<ul style="list-style-type: none"> They connect the fluorescent lamp to electricity .
12. Battery :	<ul style="list-style-type: none"> It works as a source of electric current in the electric circuit .

3. Give a reason for each of the following:

1. The presence of argon gas in glowing lamps.
 - To protect the filament from burning as it's an inactive gas that doesn't burn and doesn't help in burning.
2. The filament of the regular light bulb is made of tungsten.
 - As it has a high melting point.
3. There is a glass bulb around the filament.
 - To prevent air from reaching the filament.
4. There are two pieces of lead in the light bulb.
 - To connect the lamp with electricity in order to make the filament glow.
5. There are two points of connection to each tip of the fluorescent lamp.
 - As they connect the fluorescent lamp to electricity.
6. The surface of the fluorescent lamp is covered from inside with a phosphoric layer.
 - Because when the electric current enters the fluorescent lamp, it makes the phosphorus lining glow.
7. Electric lamps are connected at home in parallel.
 - So that if one lamp is burnt or broken, other lamps don't turn off and the intensity of lamps doesn't get effected by increasing the number of lamps.
8. The light intensity decreases by increasing the number of electric lamps in case of connecting them in series.
 - As the electric current will be divided among the lamps.
9. There must be a switch in the electric circuit.
 - To control opening or closing the electric circuit.
10. The presence of a battery in the electric circuit.
 - Because the battery is the source of electricity in the electric circuit.
11. Decorative lamps are connected in parallel not in series.
 - So that if one lamp is burnt or broken, other lamps don't turn off and by increasing number of lamps the intensity of electric lamps doesn't get affected.
12. We use a wooden bar to push injured persons from electric accidents.
 - As wood is a bad conductor of electricity.
13. Water is not used to put out electric fires.
 - As water is a good conductor of electricity so the fire will increase.

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14. It is advisable not to place a heater next to carpets and textiles.
 - As when the heater is overheated, this causes electric fire.
15. Electric wires are made of copper.
 - Because copper is a good conductor of electricity.
16. Hands of screwdrivers and electric tools are made of rubber or glass.
 - As rubber and glass are bad conductors of electricity.
17. Electric cables are covered with insulated materials.
 - As insulated materials don't allow electricity to pass through.
18. It is advisable to decrease the load on the connection net in houses.
 - In order to avoid electric fires.
19. Uncovered electric wires should never be touched.
 - In order to avoid electric shocks.
20. It is advisable not to touch electric switches with wet hands.
 - To avoid electric shocks as water is a good conductor of electricity.
21. Not placing flammable materials close to the electric machines that generate heat.
 - As when these electric materials are overheated, they can cause electric fires.
22. Don't place any metallic objects inside the socket.
 - To avoid electric shock as metals are good conductors of electricity.
23. Plugging more than one machine to one socket causes electric fires.
 - Because an overload of electricity will happen.
24. Aluminum is an electric conductor, while plastic is an electric insulator.
 - As aluminum allows electricity to pass through, but plastic doesn't allow electricity to pass through.

4. What happens if ...?

1. There is no glass bulb around the parts of the lamp.
 - The filament will burn.
2. There is air inside the electric lamp.
 - The tungsten filament burns and the electric lamp is damaged.
3. There is no battery in the electric circuit.
 - There will be no electric source.
4. A light bulb burns out in an electric circuit connected in series.
 - The other light bulbs will turn off.
5. The electric current passes through the tungsten filament.
 - It heats up and glows to produce light.
6. You plug several machines in one socket.
 - It will cause an electric overload which causes an electric fire.
7. A piece of glass is placed in an electric circuit.
 - Electricity will not pass through.
8. You touch an electric device with wet hands.
 - You will get an electric shock.
9. You try to fix an electric machine while it is switched on.
 - You will get an electric shock.
10. You increase the number of lamps in an electric circuit connected in series.
 - Light intensity decreases and the lamps may all turn off.
11. A part of your body touches an iron connected to electricity.
 - You will get an electric burn.
12. A lamp is burnt in a circuit connected in series.
 - The circuit will be opened and the electric current will stop flowing and the rest of the lamps will turn off.
13. You connect more than one lamp in parallel in an electric circuit.
 - Light intensity of lamps remains as it is and is not affected.
14. You put out an electric fire using water.
 - The harm and damage of the fire will increase and threat the rescuers involved as water is a good conductor of electricity.

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15. A part of your body touches an electric source directly.
- This causes electric shock which may damage the body tissues.
16. You place a heater beside carpets and textiles.
- It may cause electric fire.
17. You push a person suffering from an electric shock with an iron bar to isolate him from the circuit.
- Electricity will flow into your body and put you in a great danger.
18. The electric current is not disconnected from the devices that produce heat.
- This may cause fire.

5. Comparisons:


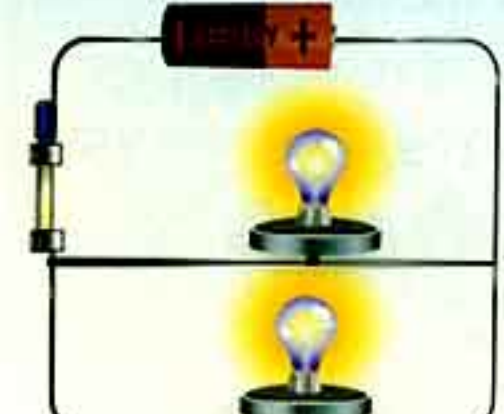
1. Compare between electric conductors and electric insulators:

P.O.C.	Electric conductors	Electric insulators
Definition	• They are materials that allow the flow of electricity through them.	• They are materials that don't allow the flow of electricity through them.
Examples	• Iron, copper and aluminum.	• Wood, plastic and clothes.


2. Compare between the light bulb and the fluorescent lamp:

P.O.C.	The light bulb	The fluorescent lamp
Structure	1. Glass bulb. 2. Tungsten filament. 3. Base of light bulb.	1. Glass bulb. 2. Two tungsten filaments. 3. Two points of connection.
The gas used	• Argon gas.	• Argon gas and little amount of mercury vapor.
Uses	• Lighting houses, car lights and torches.	1. Lighting houses and offices. 2. Decorating commercial stores. 3. Decorating commercial advertisements.

3. Compare between methods of connecting light bulbs in the electric circuit:

P.O.C.	Series connection	Parallel connection
1. Ways of connection	 <ul style="list-style-type: none"> Lamps are connected one after the other in one route. 	 <ul style="list-style-type: none"> Lamps are connected in branching routes.
2. Light intensity	<ul style="list-style-type: none"> The light intensity decreases by increasing the number of lamps. 	<ul style="list-style-type: none"> The light intensity is not affected (remains constant) by increasing the number of lamps.
3. The effect of burning or unscrewing any of lamps	<ul style="list-style-type: none"> All the lamps are turned off. 	<ul style="list-style-type: none"> The other lamps are not affected and still turned on.

4. Compare between electric fires and regular fires:

Electric fires	Regular fires
<ul style="list-style-type: none"> They're caused by increasing of the temperature of electric devices or wires. They cannot be put out by water.  Because water is a good conductor of electricity, so it will increase the fire and harm the rescuers. 	<ul style="list-style-type: none"> They're caused by overheating materials and burning without the involvement of electricity. They can be put out by water.
<ul style="list-style-type: none"> Sand is used to put out electric fires. 	<ul style="list-style-type: none"> Water or fire extinguishers can be used to put out regular fires.

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5. Direct injuries resulting from the improper use of electricity:

Electric shock	Electric fires	Electric burns
<ul style="list-style-type: none"> One of the dangers of electricity resulting from the passing of the electric current through human body. 	<ul style="list-style-type: none"> One of the dangers of electricity resulting from increasing the temperature of machines. 	<ul style="list-style-type: none"> One of the dangers of electricity that causes the damage of body tissues.

6. What is the harm of each of the following?

- The electric shock.
 - It burns the body and may cause death.
- Electric overload.
 - It causes electric fires.
- Electric burn.
 - It causes the damage of body tissues.

7. Diagrams:

1. The structure of the light bulb:

1 Thin glass bulb

- Made of thin glass filled with noble gas (argon gas).

Function:

- It prevents air from reaching the filament.
- To protect it from burning.



2 The tungsten filament

- A coiled thin wire made of tungsten.



Because it has a high melting point that prevents the filament from melting at high temperature.

Function:

- It is heated till it glows and emits light when electric current passes through the filament.

3 Noble gas

The noble gas (argon) is found inside the glass bulb.



Because it does not burn and does not help in burning.

Function:

- It prevents the filament from burning.
- It increases the lifetime of the filament.

4 Copper wires

- Two copper wires connect between the filament and the base of the light bulb.

Function:

- They allow the electric current to pass from the base to the filament.



5 The base of lamp

Function:

- It carries the light bulb in an upright position.
- It connects the light bulb to the electric circuit.

Types:

1. Spiral base:

- It has one piece of lead to connect the lamp with electricity.



2. Two-sided nail base:

- It has two pieces of lead to connect the lamp with electricity.



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2. The structure of the fluorescent lamp:

1 Glass tube

- It is vacuumed from air and contains argon and a little amount of mercury vapor.
- The inner surface is covered with phosphoric material.



2 Two tungsten filaments

- They are located at the two tips of the lamp from inside.
- Each tip contains a filament of tungsten.



3 Two points of connection

- There are two conducting points on each tip of the lamp. Function: They connect the fluorescent lamp to electricity.



3. Safety precautions when dealing with electricity:

1

Don't touch electric machines connected to electric current with wet hands.



2

Don't insert metal objects in electric sockets.



3

Don't play with electric connections.



4

Don't turn on too many devices at the same time (electric overload).



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5

Don't use one socket for many devices at the same time.



6

Don't touch uncovered wires while electricity is flowing through them.



7

Don't leave or (use) an electric device connected to the electric current while taking a bath.



8

Don't place flammable substances near electric devices that produce heat.



9

Don't leave the electric cables on the floor or under the carpet.



10

Close the sockets with plastic pieces to secure them.



11

Unplug the electric devices when the electric current is cut off.



Unit 3

The Universe

Remember what you have learnt in this unit through the following points:

- 1 Definitions
- 2 Determine the function of each of the following
- 3 Give a reason for each of the following
- 4 What happens when ...?
- 5 Comparisons

1. Definitions:

Term	Definition
The solar eclipse phenomenon	<ul style="list-style-type: none"> It is the astronomical phenomenon which occurs when the Earth, the Moon and the Sun are nearly on one straight line with the Moon in the middle.
Total solar eclipse:	<ul style="list-style-type: none"> It is the type of solar eclipse in which we can not see the sun completely .
Partial solar eclipse :	<ul style="list-style-type: none"> It is the type of solar eclipse in which we can see a part of the sun .
Annular solar eclipse:	<ul style="list-style-type: none"> It is the type of solar eclipse in which the sun appears as a lighted ring .
The cone umbra	<ul style="list-style-type: none"> It is the dark inner shadow area in which the total solar eclipse appears.
Penumbra	<ul style="list-style-type: none"> It is the faint outer shadow area in which the partial solar eclipse appears.
The lunar eclipse	<ul style="list-style-type: none"> It is the astronomical phenomenon which occurs when the Sun, the Earth and the Moon are nearly on one straight line with the Earth in the middle hiding the sunlight from the Moon.
Total lunar eclipse	<ul style="list-style-type: none"> It is the lunar eclipse which happens when the whole Moon falls in the shadow area (umbra) of the Earth.
Partial lunar eclipse	<ul style="list-style-type: none"> It is the lunar eclipse which happens when part of the Moon lies in the shadow area (umbra) of the Earth and the other part lies in the semi-shaded area (penumbra) of the Earth where we cannot see a part of the Moon.

2. Determine the function of each of the following:

1. Shadow	<ul style="list-style-type: none"> It moderates the temperature.
2. Special sunglasses	<ul style="list-style-type: none"> They protect eyes from the harmful rays (UV – IR) that affect the retina of eye and may cause blindness for few minutes.

3. Give a reason for each of the following:

- The formation of the solar eclipse phenomenon.
 - Because the Earth, Moon and Sun are on a straight line with the Moon in the middle.
 - Because the Moon blocks the sunlight totally from a part of the Earth's surface.
- The distance between the Moon and the Earth varies during the Moon's rotation around the Earth .
 - Because the Moon rotates around the Earth in an oval shaped orbit .
- The type of the solar eclipse differs according to the movement of the Moon in front of the Sun .
 - Due to the differences in the part of the Sun that the Moon hides during its passage in front of the Sun .
- We should not look directly at the Sun with the naked eye during the solar eclipse. Doctors warn of looking directly at the Sun during the solar eclipse.
 - Because outer solar corona keeps on emitting harmful rays (UV - IR) which cause blindness for few minutes.
- The use of special sunglasses to look at the Sun during the solar eclipse.
 - To avoid harmful effect of (UV - IR) radiations.
- Lunar eclipse occurs in the middle of the lunar month. (Full Moon)
 - Because in the middle of the lunar month the Earth lies between the Sun and the Moon.
- The occurrence of the total lunar eclipse.
 - Because the Moon lies in the shadow area (umbra) of the Earth.
- The Moon tends to be red at the start of the total lunar eclipse.
 - Because red rays which are not absorbed by the Earth's atmosphere reach the Moon.
- The occurrence of the partial lunar eclipse.
 - Because part of the Moon lies in the shadow area (umbra) of the Earth and the other part lies in the semi-shaded area (penumbra) of the Earth.
- Both the solar and the lunar eclipses are applications of the shadow phenomenon.
 - Because both of them are caused by blocking of sunlight and casting the middle body shadow on the other celestial body.
- The effect of the lunar eclipse on the eye differs from that of the solar eclipse.
 - Because lunar eclipse has no effect on the retina of the eyes.
- The Earth has an important role in the formation of the lunar eclipse.
 - Because it blocks the light forming shadow cone.

13. The two phenomena of the lunar and the solar eclipses are repeated regularly and can be predicted.
 - Because they depend on the movement of the Moon around the Earth and the movement of the Earth around the Sun, which occur regularly.
14. The lunar eclipse doesn't require precautions or special devices to observe it.
 - Because there's no harmful rays emitted during it.
15. No annular lunar eclipse is formed like the annular solar eclipse .
 - Because the Earth has a great size relative to the Moon, so it always blocks all sunlight when it comes between the Sun and the Moon on the same straight line .

4. What happens when ...?

1. The Moon comes between the Sun and the Earth in one straight line.
 - The solar eclipse occurs.
2. The Moon hides a part of the sun from the Earth's surface.
 - A partial solar eclipse occurs.
3. The Moon lies in a higher orbit than Earth.
 - Annular solar eclipse occurs.
4. The Moon cone shadows does not reach the Earth .
 - The Earth lies in the antumbra area of the Moon forming annular solar eclipse .
- 5- Someone looks to the Sun directly during the solar eclipse with naked eye for a long time to observe solar eclipse .
 - The eye retina will be harmed and blindness may occur .
6. The Earth comes between the Sun and the Moon in one straight line.
OR The whole Moon lies in the Earth's umbra.
 - The lunar eclipse occurs.
7. A part of the Moon enters the shadow area of the Earth.
 - The partial lunar eclipse occurs.
8. The Earth blocks the sunlight from reaching the whole Moon .
 - Total lunar eclipse occurs .
9. The whole Moon enters the semi-shaded area of Earth .
 - The Moon light turns to be faint without being eclipsed which is known as lunar non-eclipse .
10. The whole Moon enters the Earth's umbra.
 - Total lunar eclipse .

5. Comparisons:

1. Compare between total, partial, and annular solar eclipses:

P.O.C.	Total solar eclipse	Partial solar eclipse	Annular solar eclipse
1. Shape of the Sun	<ul style="list-style-type: none"> Disappears completely (dark disc) 	<ul style="list-style-type: none"> Partial disappearing (incomplete disc) 	<ul style="list-style-type: none"> Appears as a lighted ring
2. Shadow area that casts on the Earth	<ul style="list-style-type: none"> Umbra 	<ul style="list-style-type: none"> Penumbra 	<ul style="list-style-type: none"> Antumbra.
3. Position of the Moon	<ul style="list-style-type: none"> Nearer to the Earth 	<ul style="list-style-type: none"> Farther or nearer to the Earth 	<ul style="list-style-type: none"> In an orbit higher from the Earth

2. Compare between solar eclipse and lunar eclipse:

P.O.C.	Solar eclipse	Lunar eclipse
1. Reason	When the Moon lies between the Earth and the Sun on one straight line.	When the Earth lies between the Sun and the Moon on one straight line.
2. Time of occurrence	Daytime (in the morning).	Nighttime The Sun is behind the horizon.
3. Harm	Severe eye harm.	No harm.
4. Safety precautions	It requires precautions and special detecting devices.	It does not require safety precautions.
5. Duration	Seven minutes and forty seconds.	It may last up to two hours.
6. Types	<ul style="list-style-type: none"> Total solar eclipse. Partial solar eclipse. Annular eclipse. 	<ul style="list-style-type: none"> Total lunar eclipse. Partial lunar eclipse.

Unit 4

Structure and Function of Living Organisms

**Remember what you have learnt in this unit
through the following points:**

- 1 Definitions
- 2 Give a reason for each of the following
- 3 What happens if ...?
- 4 Diagrams

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1. Definitions:

Term	Definition
Photosynthesis process	<ul style="list-style-type: none"> A vital process carried out by the plant to make its own food.
The shoot system in the plant	<ul style="list-style-type: none"> Located above the soil and consists of stem, leaves, buds, flowers and fruits.
The root system in the plant	<ul style="list-style-type: none"> Located under the soil and consists of the root and root hairs.
Root hairs	<ul style="list-style-type: none"> Root extensions composed of thin cell walls, cytoplasm and vacuole.
Endodermis	<ul style="list-style-type: none"> Inner cells in the root that regulate the passing of water to the xylem.
Xylem	<ul style="list-style-type: none"> Vessels through which water passes from the root to the stem and leaves.
Selective permeability	<ul style="list-style-type: none"> The property with which root hairs allow certain mineral salts to pass and prevent others according to the needs of the plant.
Osmosis property	<ul style="list-style-type: none"> The transfer of water from an area of high concentration of water (soil) to another area of low concentration of water (root hairs).
Transpiration	<ul style="list-style-type: none"> It is a vital (bio) process by which the plant loses water in the form of water vapor from the leaves through holes called stomata or from other green parts.
Stomata	<ul style="list-style-type: none"> Tiny holes that are found on the upper and lower surfaces of the plants' leaves through which the plant gets rid of excess water by transpiration process.
Two guard cells	<ul style="list-style-type: none"> Two cells located at the sides of the stoma and regulate opening and closing the stoma during transpiration.
Respiration	<ul style="list-style-type: none"> A vital process carried out by the living organism to obtain the necessary energy to perform all other vital activities.

2. Give a reason for each of the following:

1. Light is important for the plant.
 - To make the photosynthesis process.
2. Root hairs can absorb water from the soil.
 - Due to the osmosis feature that takes place through the semi-permeable membrane of the root hairs.
3. The cell membrane of root hairs has a selective permeability property.
 - In order to allow some types of salts to pass and prevent others according to the needs of the cell.
4. The presence of highly concentrated sap vacuole in root hairs.
OR The salt solution inside the vacuole is greater than the salt solution in the soil.
 - To allow the transmission of water from soil to root by the osmosis process.
5. Water rushes from the soil into root hairs through its semi-permeable membrane.
 - Due to the osmosis process.
6. The presence of stomata openings on the lower surface of the plants' leaves.
 - To allow plants to get rid of excess water by the transpiration process.
7. Each stoma is surrounded by two guard cells.
 - To control the opening and closing of stoma.

3. What happens if ...?

1. The green plant is covered with a black plastic bag.
 - The plant will stop carrying out the photosynthesis process and will die.
2. Large plants don't contain enough xylem vessels.
 - The passing of water and mineral salts to the top of these plants will stop.
3. Concentration of salts in the soil is higher than the concentration of salts in the sap vacuoles of the root hairs.
 - Water will transfer from the root to the soil and the plant will wilt and die.

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4. There are no stomata.

- Plant won't be able to do the transpiration process.

5. There are no guard cells on the stomata.

- The stomata will remain open and transpiration process will not be controlled.

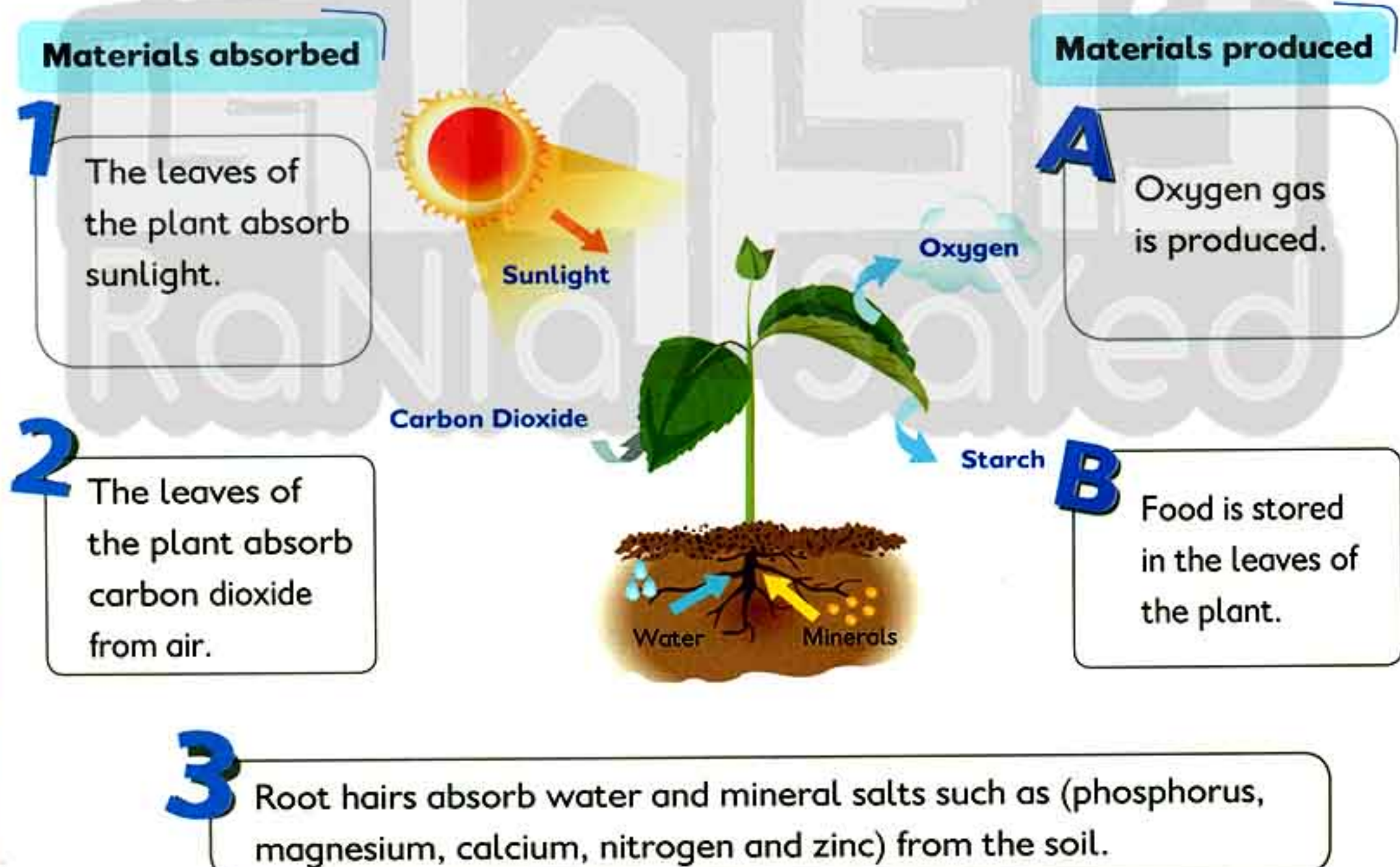
6. There is no osmosis feature in the plant .

- Water cannot transport from the soil to the root hairs, so the plant will die.

7. Absence of cell membrane of the root hair .

- The root hairs cannot control passing of some types of salts according to the plant's need.

4. Diagrams:



- ▶ Water and mineral salts are transmitted from soil to other parts of the plant by two stages.

Unit 4: Structure and Function of Living Organisms

Stages of transmission

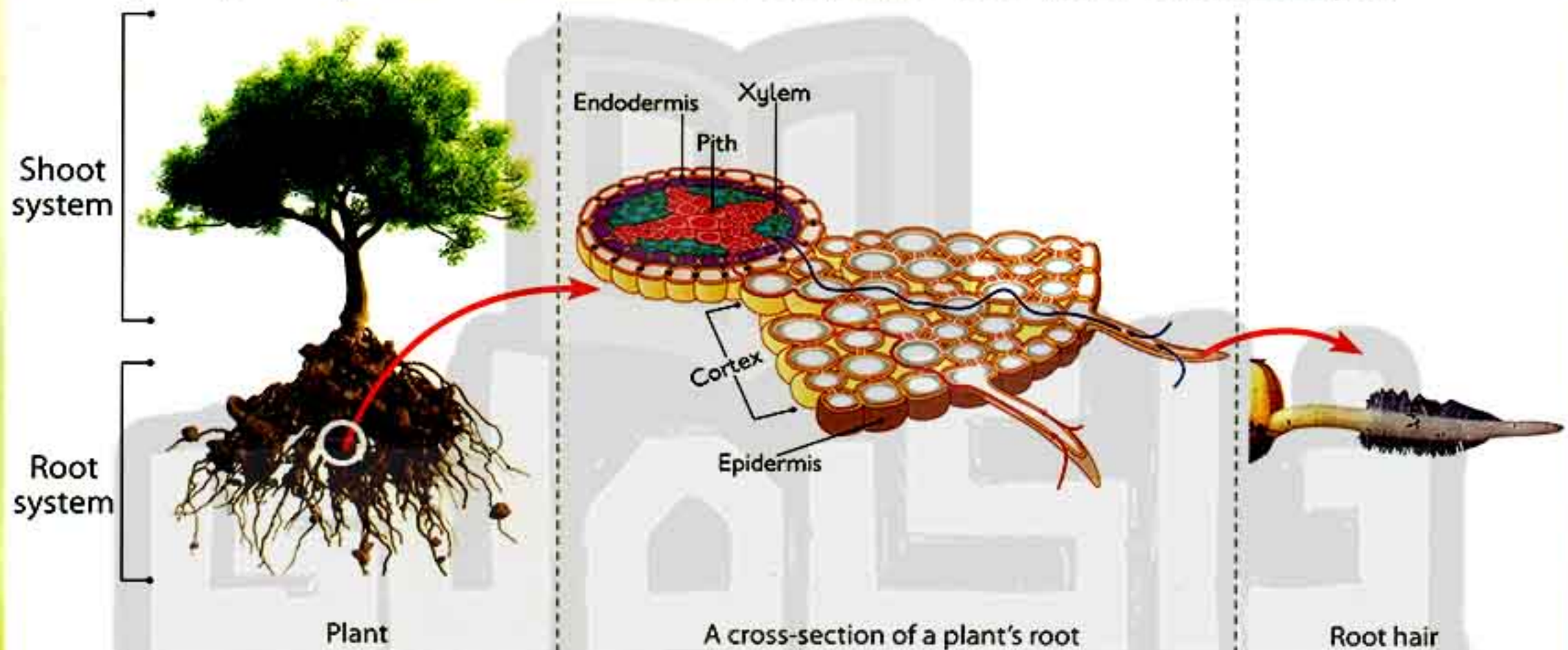
First Stage

Absorption of water and mineral salts from the soil through root hairs.

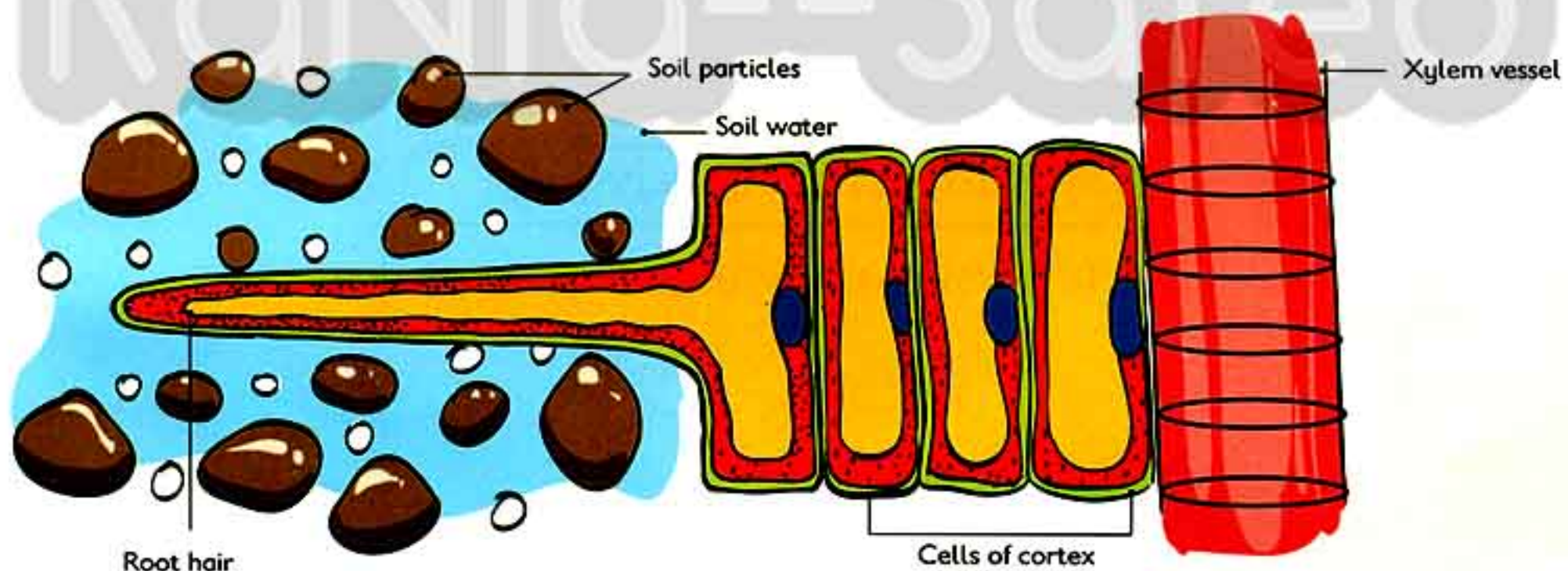
Second Stage

Transmission of plant juice (water - mineral salts) from the root to the other parts of the plant through the stem.

- In order to know the structure and function of the root system in plants, examine a (ready-made) slide of a cross-section of a plant's root under a microscope:



- Water and mineral salts transmission:



- 1 Water and mineral salts are absorbed through root hairs in the epidermis layer of the root.
- 2 They are transmitted to the endodermis layer which regulates the passing of water to xylem.
- 3 Xylem (wood layer) rises them to stem and other parts of the plant.

Unit 1 Force and Motion

Lesson 1

Types of levers

Answer Guide P. 15

Worksheet 1

1 A) Write the scientific term for each of the following:

1. A rigid bar that rotates on a fixed point and is affected by the force and the resistance. (.....)
2. A fixed point on which a rigid bar rotates. (.....)
3. The force that is exerted by a person to overcome the resistance. (.....)
4. The force which results from the weight of an object we want to move. (.....)

B) Give a reason for each of the following:

1. Crowbar is considered an increasing force lever.
.....
2. Doctors and watchmakers use tweezers as a lever.
.....

2 A) Complete the following sentences:

1. The scientist was the first who invented levers to facilitate tasks.
2. The simple machine that is composed of a bar and helps to perform tasks easily is called
3. and are examples of levers.
4. and are from the benefits of levers.
5. The lever consists of and

B) Put (✓) or (X) in front of each sentence:

1. Levers are the most common, simple machines. ()
2. The rigid bar of a lever is affected by three forces. ()
3. From the functions of levers is to decrease speed. ()



Worksheets & Exams

3 A) Determine the function of each of the following:

1. Ice holder

2. Tweezers

3. Hockey bat

4. Nutcracker

5. Crowbar

6. Manual broom

B) Correct the underlined words:

1. Hockey bat is an example of increasing distance levers. (.....)
2. Some of the levers allow the increase in the speed of the objects that we inflict on as in the manual broom. (.....)
3. Tweezers and a hockey bat save the exerted effort. (.....)
4. Crowbar is an example of using levers to avoid dangers. (.....)

4 A) Choose the correct answer:

1. The force that is exerted to equilibrate the resistance is called
a. fulcrum b. effort c. friction
2. Which of the following levers is used to transfer force from one place to another?
.....
a. Manual broom. b. Scissors. c. Stapler.
3. All the following are among functions of levers except
a. increasing speed b. increasing size c. increasing force

B) What would happen if we did not have levers?

.....

.....

.....

.....

.....

.....

Worksheet 2

1 A) Choose the correct answer:

1. Nutcracker is a class lever.

(first – second – third)

2. Tweezers are used to

(increase force – pick up minute objects – increase speed)

3. Levers were first described by

(Newton – Einstein – Archimedes)

4. To move a heavy stone, we use

(wheelbarrow – crowbar – pliers)

B) Give a reason for each of the following:

1. Nail clippers are a first class lever.

.....

2. Wheelbarrow is a second class lever.

.....

2 A) Complete the following sentences:

1. In the first class levers, the lies between and

2. is the most popular type of levers in our daily life.

3. Crowbar is a class lever, while is a third class lever.

4. From the examples of levers that are used to avoid dangers is

B) Mention four functions of levers.

.....

.....

.....

.....



Worksheets & Exams

3 A) Correct the underlined words:

1. Cool holder is a first class lever. (.....)
2. The fulcrum lies between the effort force and the resistance force in the third class lever. (.....)
3. Manual broom is one of the second class levers. (.....)
4. The fulcrum is always between the effort force and the resistance force. (.....)

B) Identify the type of the lever.



a.



b.



c.



d.

4 A) Put (✓) or (X) in front of each sentence:

1. The fulcrum in scissors lies between the effort force and the resistance force. ()
2. A lever is affected by effort force only. ()
3. Manual broom is used in increasing distance and transferring force. ()
4. Levers are not useful. ()

B) What is meant by ...?

1. The first class levers.

.....

2. The second class levers.

.....

3. The third class levers.

.....

2

Law of levers

Answer Guide P. 15

Worksheet 3

1 A) Complete the following sentences:

1. Force \times its arm = \times
2. If the arm of force is shorter than the arm of resistance, then the effort force is than the resistance force.
3. is the distance between the effort force and the fulcrum.
4. is the distance between the resistance force and the fulcrum.
5. The effort force and the resistance are measured in

B) Put (✓) or (X) in front of each sentence:

1. When the effort arm is longer than the resistance arm, the lever saves effort. ()
2. The resistance arm is measured in meter. ()

2 A) Write the scientific term for each of the following:

1. Levers that always save effort. (.....)
2. The product of effort force multiplied by its arm equals the product of resistance multiplied by its arm. (.....)
3. A lever is used to carry out jobs accurately. (.....)

B) What happens in the following cases?

1. The arm of force is longer than the arm of resistance.

.....

.....

2. The arm of force is shorter than the arm of resistance.

.....

.....



Worksheets & Exams

3 A) Give a reason for each of the following:

1. In the second class levers, the effort force is always less than the resistance force.

.....

2. Sometimes the first class levers save effort.

.....

3. The third class levers are very important although they don't conserve effort.

.....

B) Match the sentences in column (A) with the correct sentences in column (B):

(A)	(B)
1. The first class levers	a. levers that always save effort.
2. The second class levers	b. levers that never save effort.
3. The third class levers	c. levers that sometimes save effort.
4. The lever	d. is a fixed point on which the rigid bar rotates.
5. The fulcrum	e. is a rigid bar that moves around a fixed point and is affected by effort force and resistance force.

1. 2. 3. 4. 5.

4 A) A first class lever is affected by a force of 500 Newton with an arm length of 20 cm and has a resistance of 200 Newton. Calculate the length of the arm of resistance.

.....

.....

.....

B) A force of 5000 Newton is affecting a lever where the arm of force is 20 m, the resistance is 10000 Newton and the arm of resistance is 5 m. Determine if the lever is balanced or not.

.....

.....

.....

Worksheet 4

1 A) Complete the following sentences:

1. If the effort force equals 20 N, the resistance is 8 N and the effort arm = 4 cm, then the resistance arm equals
2. A lever saves effort when the arm of is longer than the arm of
3. The third class levers effort, while the second class levers effort.

B) Write the scientific term of each of the following:

1. The distance between the resistance force and the fulcrum. (.....)
2. They are simple machines that always save effort. (.....)
3. Levers that sometimes save effort. (.....)

2 A) A second class lever is affected by a force of 100 Newton, with a force arm of 40 cm. The lever has also a resistance of 200 Newton. Calculate the length of the resistance arm.

.....

.....

B) Compare between the three types of levers.

P.O.C	First class levers	Second class levers	Third class levers
Definition			
Locations of F, O, R			
Effort force arm and resistance arm			
Saving effort			
Benefits			
Examples			

Worksheets & Exams

- 3** A) A balanced lever is affected by a resistance that equals 30 Newton with an arm of length 2 cm. Calculate the value of the force needed of the other end of a distance 3 cm from the fulcrum.
-
-

B) What is meant by ...?

1. A lever is an effort-saving machine.
-

2. A lever is not an effort-saving machine.
-

- 4** A) Give a reason for each of the following:

1. Some of the first class levers conserve effort but others do not.
-

2. Wheelbarrow has a mechanical benefit.
-

3. Coal holder does not have a mechanical benefit.
-

B) Match column (A) with what suits in column (B):

(A)	(B)
1. First class levers	a) always conserve effort.
2. Second class levers	b) sometimes conserve effort.
3. Third class levers	c) never conserve effort.

1.

2.

3.

School BOOK Exercises

on Unit 1

Answer Guide P. 16

1 Match column (A) with its correspondence in column (B):

	Column (A)
1	First class levers
2	Second class levers
3	Third class levers
4	The levers
5	The force
6	The resistance
7	The fulcrum

	Column (B)
a	Levers that always conserve the effort.
b	Levers that not conserve the effort.
c	Levers that sometimes conserve the effort.
d	A fixed point that a rigid bar sits on.
e	A rigid bar rotates around a fixed point, and is affected by a force and a fixed resistance.

2 Put (✓) or (X) in front of each of the following sentences, and correct the false ones:

1. The first class levers have the resistance between the force and the fulcrum. ()
2. The second class levers have the force between the resistance and the fulcrum. ()
3. The third class levers have the fulcrum between the force and the resistance. ()
4. The crowbar is an example of the first class levers. ()
5. If the arm of the force is smaller than the arm of the resistance, then the lever conserves the effort. ()

3 Complete the following sentence:

1. The nutcracker is an example of the levers.
2. The manual broom is an example of the levers.
3. The scissors are an example of the levers.
4. The force \times its arm = \times
5. The type of the levers where the arm of the force and the arm of resistance are equal is

Worksheets & Exams

4 Compare between the three types of levers using the following table:

Points of comparison	First class levers	Second class levers	Third class levers
Definition			
Conservation of effort			
Examples			

5 Classify the following items according to the type of lever:



a



b



c



d



e



f

6 The force affecting a second class lever equals 200 Newton and the length of its arm is 50 cm and has a resistance with a value of 100 Newton; calculate the value of the arm of the resistance.

.....

.....

7 The arm length of a third class lever is 5 cm, and the length of the arm of the resistance is 15 cm. If the resistance has a value of 300 Newton, calculate the value of the affecting force.

.....

.....



GEM

General Tests on Unit

1

Answer Guide P. 17

(Total mark: 20)

Test 1

1 A) Put (✓) or (X) in front of the following sentences:

(5 marks)

1. The force lies between the resistance and the fulcrum in the first class levers. ()
2. The resistance lies between the force and the fulcrum in the second class levers. ()
3. Crowbar is a first class lever. ()
4. A lever saves efforts when the arm of the force is longer than the arm of the resistance. ()
5. The fulcrum lies between the force and the resistance in the third class levers. ()
6. The lever balances when the product of "effort force x its arm" is equal to the product of "resistance force x its arm". ()

B) Give a reason for each of the following:

1. Levers are very important in our daily life.

.....

.....

.....

2. Manual broom doesn't have a mechanical benefit.

.....

.....

.....

2 A) Complete the following sentences:

(5 marks)

1. The only type of levers where the arm of force and the arm of resistance are equal is
2. Scissors are from the class levers.
3. The force arm is the distance between and



GEM / Science / Primary 6

13



هذا العمل خاص بموقع ذاكرولي التعليمي ولا يسمح بتداوله على مواقع أخرى

Worksheets & Exams

B) A first class lever is affected by 10 Newton force with an arm of 10 cm length and a resistance of 20 Newton.

1. Calculate the length of the arm of resistance.

.....

.....

2. Does the lever save effort? Why?

.....

.....

3 A) What happens when ...?

(5 marks)

1. The effort force is less than the resistance force.

.....

2. The effort force is equal to the resistance force.

.....

B) Write the scientific term:

1. The type of levers, where the effort force is always smaller than the resistance force.

(.....)

2. The lever which provides accuracy in performance.

(.....)

3. The most popular type of levers in our daily life.

(.....)

4 A) Correct the underlined words:

(5 marks)

1. Bottle opener is an example of the third class levers.

2. The human arm is from the second class levers.

3. The first class levers always have no mechanical benefits.

4. Coal holder is an effort-saving lever.

B) A third class lever with a force arm of 0.5 meter length, and a resistance arm of 15 cm length. If the resistance equals 200 Newton, calculate the affecting force on the lever.

.....

.....

(Total mark: 20)

Test 2

1 A) Write the scientific term for each of the following:

(5 marks)

1. The type of levers that sometimes save effort. (.....)
2. The force that is exerted by a person to equilibrate the resistance force. (.....)
3. A lever where the fulcrum lies between the force and the resistance. (.....)
4. The distance between the resistance force and fulcrum. (.....)

B) Give a reason for each of the following:

1. The second class levers always save effort.
.....
2. The third class levers don't save effort.
.....

C) The length of the force arm of a first class lever is 5 cm and the length of the arm of resistance is 20 cm. If the resistance has a value of 200 Newton, calculate the value of the affecting force.

2 A) Complete the following sentences:

(5 marks)

1. Some levers allow increasing the speed of objects we inflict on as in
2. If the force arm is longer than the resistance arm, then the force is than resistance.
3. The class levers are the levers where the force arm can be equal to the resistance arm.
4. Balance and seesaw are considered examples of

B) Determine which of the following levers saves effort and why:



1.
2.
3.

Worksheets & Exams

3 A) Choose the correct answer:

(5 marks)

- The lever that has the fulcrum between the force and resistance is
 - wheelbarrow
 - soda water opener
 - seesaw
 - ice holder
- All levers and machines
 - are made of the same substances
 - have a fixed point called the fulcrum
 - are similar in shape and size
 - do not have specific functions
- All the following are levers that save effort except the
 - crowbar
 - nutcracker
 - wheelbarrow
 - ice holder
- The lever saves effort when
 - the arm of force = the arm of resistance
 - the arm of force is longer than the arm of resistance
 - the arm of force is shorter than the arm of resistance
 - force = resistance

B) What is meant by ...?

1. Lever.

2. The law of levers.

4 A) Put (✓) or (X) in front of each sentence:

(5 marks)

- The fulcrum of any lever is always between the effort force and the resistance force. ()
- The third class levers never save effort. ()
- Effort force is measured in kilogram. ()

B) What happens if ...?

1. The force arm is shorter than the resistance arm.

2. We don't have levers.

Unit 2 Electric Energy

Lesson 1

Electric lamps

Answer Guide P. 17

Worksheet 5

1 A) Choose the correct answer:

1. A /An converts the electric energy into light energy.
a. electric iron b. electric lamp c. electric heater d. washing machine
2. The filament of the light bulb is made of
a. tungsten b. copper c. iron d. aluminum
3. A prevents air from reaching the filament.
a. glass bulb b. copper wire
c. a piece of lead d. base of the light
4. All the following are parts of the fluorescent lamp except the
a. points of connection b. glass tube
c. tungsten filament d. base of the bulb

B) Give a reason for each of the following:

1. The filament of the light bulb is made of tungsten.
.....
2. The glass bulb of the light bulb is filled with inert argon gas.
.....
3. There are two points of connection at each tip of the fluorescent lamp.
.....

2 A) Complete the following:

1. and are kinds of electric lamps.
2. The filament of the regular electric lamp is made of because it has a high

Worksheets & Exams

3. is used to prevent the tungsten filament from burning.
4. In the light bulb copper wires allow the electric current to pass from and
5. A fluorescent lamp filled with inert gas.
6. The inventor of the electric lamp is

B) Put (✓) or (X) in front of each of the following:

1. Electric bulbs are one of the most popular sources of artificial light. ()
2. The glass bulb of the electric lamp contains the atmospheric air. ()
3. Fluorescent lamps are called neon lamps, because they contain an inert gas called neon. ()
4. The filament of the light bulb is made of copper. ()

3 A) What is meant by ...?

- Electric lamp.

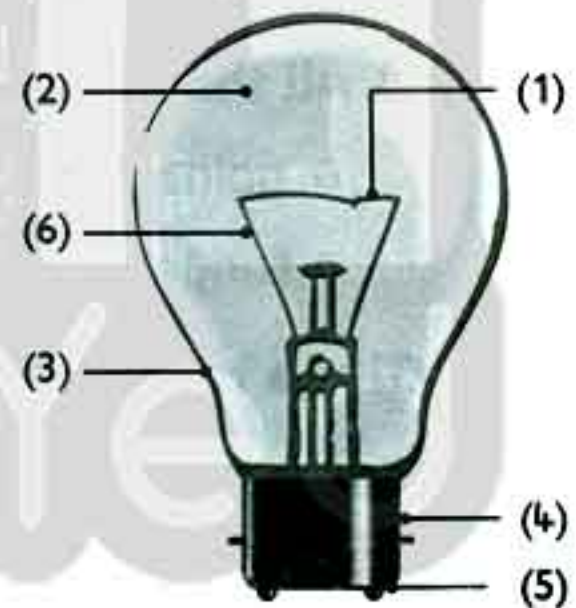
.....

B) Look at the opposite figure, then answer:

a. What is the name of this figure?

b. Label the figure:

- | | |
|---------|---------|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |



4 A) What happens if ...?

1. The filament of the lamp is made of iron.

.....

2. There is air inside the glass bulb.

.....

B) Correct the underlined words in the following sentences:

1. The glass bulb of the light bulb contains an active gas.
2. There is one kind of bases for the electric bulb.
3. Electric lamps and devices are connected in series at home.
4. The light energy is converted into electric energy in the fluorescent lamp.

Worksheet 6

1 A) Put (✓) or (X) in front of each of the following sentences:

1. Lamps are connected in series in houses. ()
2. The main source of the electric current in the electric circuit is the battery. ()
3. If one of the lamps or electric devices at home is not working, the rest of lamps and devices keep working. ()
4. The light intensity decreases if a circuit is connected in series by increasing the number of lamps. ()

B) Choose the correct answer:

1. When the electric lamp is connected in parallel with others in the electric circuit, the light intensity
 a. increases b. decreases c. doesn't change
 d. sometimes decreases and increases other times
2. When we connect more than one bulb in series with an electric source, the lighting of the bulb
 a. decreases b. remains as it is c. increases d. no correct answers
3. The light bulbs are connected in in the house.
 a. parallel b. series
 c. parallel and series d. no correct answers

2 A) Match words from (A) with the suitable sentences from (B):

(A)	(B)
1. Electric circuit	a) It is a method where lamps are connected one after another in the electric circuit.
2. Parallel	b) It is a closed and continuous path through which the electric current passes.
3. Series	c) It is a way in which the light bulbs are connected in branching routes.
	d) It is an inert gas used to fill electric lamps.

1.

2.

3.



Worksheets & Exams

B) Correct the underlined words in each of the following:

1. Open electric circuit has no gaps.
2. In series electric circuit, when one light bulb burns out, the other lamps remain light.
3. To connect the lamps in parallel, the lamps are connected one after the other.
4. Fluorescent lamp contains the inert neon gas.

3 A) Write the scientific term for each of the following:

1. Lamps are called neon lamps. (.....)
2. A method where the electric lamps are connected in branching routes. (.....)
3. A type of lamps whose inner surfaces are covered with phosphoric material. (.....)

B) Give a reason for each of the following:

1. There must be a switch in the electric circuit.
.....
2. It is advisable to use energy-saving lamps.
.....
3. Electric lamps should be connected in parallel in houses.
.....

4 A) What happens if ...?

1. There is no battery in the electric circuit.
.....
2. The electric lamps are connected in series.
.....

B) Compare between connecting in series and connecting in parallel:

P.O.C	Connecting in series	Connecting in parallel
1. Light intensity		
2. The effect of burning or unscrewing any of lamps		

Lesson 2

Dangers of electricity and how to deal with it

Answer Guide P. 18

Worksheet 7

1 A) Complete the following sentences:

1. Materials are divided into and according to their conductivity of electricity.
2. The two types of electric injuries are and
3. The electric shock takes place when the passes through the human body.
4. Dangers of electricity include, and

B) Classify the following materials into electric conductors and electric insulators:

Materials	Electric conductors	Electric insulators
Wood		
Iron		
Copper		
Aluminum		
Plastic		
Wool		
Rubber		
Glass		

2 A) Write the scientific term for each of the following:

1. One of the electric dangers that damages body tissues. (.....)
2. Substances that don't allow electricity to flow through. (.....)
3. Substances that allow electricity to flow through. (.....)

B) What are the dangers that happen in the following cases?

1. Opening more than one electric device through one socket.
2. Leaving electric wires without covering them.



Worksheets & Exams

3 A) Choose the correct answer:

- Electric wires are covered with
a. lead b. copper c. plastic d. wood
- Plugging more than one device in one socket leads to
a. electric shock b. electric burn
c. increasing electric load d. all the previous answers
- is a good conductor of electricity.
a. Wood b. Copper c. Plastic d. Glass

B) Put (✓) or (X) in front of each of the following sentences:

- Plastic is a good conductor of electricity. ()
- Electric insulators allow the flow of electric current through. ()
- Iron, copper and rubber are electric conductors. ()
- When putting a piece of wood in an electric circuit, the electric current flows through it. ()

4 A) What happens in the following cases?

- Touching a source of electricity directly with a part of your body.
.....

- Inserting a piece of a rubber eraser in an electric circuit.
.....

- Putting out an electric fire by water.
.....

B) Give a reason for each of the following:

- Electric wires are made of copper.
.....

- Wood is considered an electric insulator.
.....

Worksheet 8

1 A) Put (✓) or (X) in front of each of the following sentences:

1. It is advisable to put out an electric fire using water. ()
2. We use electric insulators when we are dealing with a person suffering from an electric shock. ()
3. The battery is not a main component in the electric circuit. ()
4. It is preferable to use an electric switch in houses. ()

B) Mention factors affecting the strength of the electric shock.

.....

.....

.....

2 A) Give a reason for each of the following:

1. We should never push a person suffering from an electric shock using an iron bar.
.....
2. Power cables are covered with insulators.
.....
3. Electric wires are made of copper.
.....

B) Correct the underlined words:

1. Electric fires happen when electricity passes through the human body.
2. Among the causes of the electric fires is decreasing electric load.
3. Water is not used to put out regular fires.

3 A) Complete the following sentences:

1. The leads to destroying the tissue of the body..
2. Metallic materials are considered electric

B) What are the precautions in dealing with electricity?

.....

.....

.....

.....

Worksheets & Exams

C) How would you advise the following persons?

1. Some people are putting out an electric fire using water.

.....

2. A person is trying to save another one suffering from an electric shock.

.....

4 A) Write the scientific term for each of the following:

1. It occurs due to the passing of an electric current through the human body.

(.....)

2. Burns resulting from electricity that damage body tissues.

(.....)

B) What are the causes of electric fires?

.....

.....

.....

.....

.....

C) What happens if ...?

1. Using sand to put out electric fires.

.....

2. You place an electric heater close to furniture.

.....

3. Touching an uncovered wire while touching the ground.

.....

4. Electric wires are left uncovered and non-insulated.

.....

School BOOK Exercises

on Unit 2

Answer Guide P. 19

1 Complete the following sentences:

1. and are two ways for connecting electricity.
2. and are some precautions should be taken while dealing with the electricity.
3. The simple electric circuit consists of,, and
4. and are examples of the electric insulating materials.
5. In the case of connecting the lamps in the lighting of the lamps decreases with their increase in number.

2 Correct the underlined words in the following sentences:

1. The electric lamp converts the electric energy to the kinetic energy.
2. The filament of the light bulb is made of carbon.
3. While connecting the lamps in parallel, the lamps are connected one after the other.
4. There are two connecting points at each end of the light bulb ends.
5. The electric fire occurs due to the passage of the electric current through the human body.
6. The electric lamps are connected in the house in series.
7. The lamps in the electric circuit continue to work when connecting in series if a lamp is damaged.
8. The glass bulb of the electric lamp contains hydrogen gas.
9. Wood is considered a good conductor of electricity.

3 Give a reason for each of the following:

1. The swelling of the electric lamp contains an inert gas instead of air.
2. Not placing metal things inside the socket.
3. There are connecting points at the ends of the fluorescent lamps.
4. Not placing flammable materials too close to the electric machines that generate heat.

Worksheets & Exams

4 Compare between each of the following:

1. Connecting electric lamps in series and connecting in parallel.
2. The light bulbs and the fluorescent lamps in respect of structure.
3. The conducting materials of electricity and the non-conducting materials.

5 Write the scientific term of each of the following:

1. Materials that allow the electric current to pass through. (.....)
2. Fires occur due to the increase in the temperature of the electric wires. (.....)
3. Materials that don't allow the electric current to pass through. (.....)
4. The way that the electric lamps are connected one after the other, and the intensity of the light of the lamps decreases with the increase in their number. (.....)
5. The way of converting the electric energy to light energy. (.....)
6. The way that the lamps are connected through branching routes and the light of the lamps are not affected with the increase in their number. (.....)
7. One of the dangers of the electricity occurs due to the passing of the electric current through the human body. (.....)
8. One of the dangers of electricity is that it destroys the tissues of the body. (.....)

6 Write an explanation for each of the following:

1. The electric shock.
.....
2. The electric fires.
.....
3. The electric lamp.
.....
4. The precautions that should be taken to deal with the electricity.
.....
.....
.....
.....



GEM

General Tests on Unit

2

Answer Guide P. 19

(Total mark: 20)

Test 1

1 A) Complete the following sentences:

(5 marks)

1. Among the methods of connecting electric lamps are connecting in and connecting in
2., iron and are good conductors of electricity.
3. In the home, connection of lamps is better than connection.
4. and are kinds of electric lamps.

B) Compare between:

Natural sources of light and artificial sources of light. Give examples.

2 A) Correct the underlined words in the following sentences:

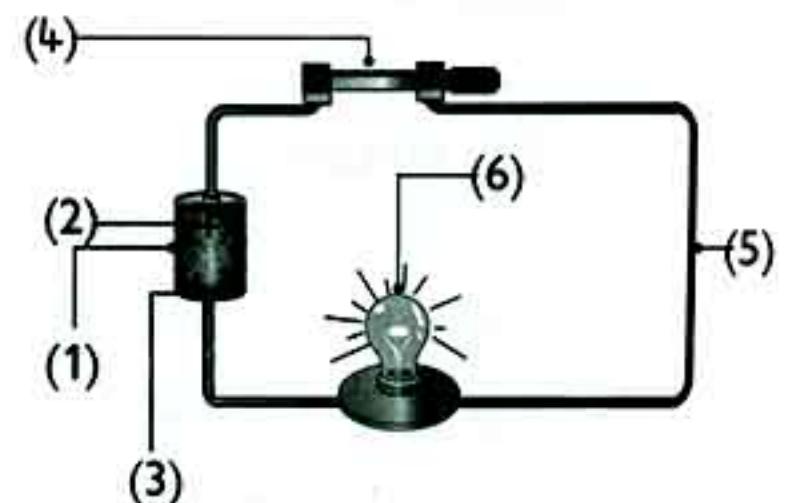
(5 marks)

1. Electric energy is converted into kinetic energy in the electric lamp.
2. The filament of the regular bulb is made of carbon.
3. On connecting in parallel, lamps are connected one after another.
4. The regular lamp has two conducting points at each of its two ends.
5. Electric fires happen when electricity passes in the human body.
6. Electric lamps are connected in series in houses.
7. The glass bulb of the regular lamp contains hydrogen gas.
8. Wood is a good conductor of electricity.

B) Label the opposite figure:

1.
2.
3.
4.
5.
6.

• The function of no. (4):



GEM / Science / Primary 6

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Worksheets & Exams

3 A) Write the scientific term:

(5 marks)

1. Substances that allow the electric current to pass through. (.....)
2. Fires that happen when electric devices become overheated. (.....)
3. Substances that don't allow the electric current to pass through. (.....)
4. A method where lamps are connected one after another. (.....)
5. A method where lamps are connected through branches and the light intensity is not affected. (.....)
6. A device that changes electric energy into light energy. (.....)
7. One of the dangers of electricity that happens when the electric current passes through the human body. (.....)
8. One of the dangers of electricity that causes damage to the body tissues. (.....)

B) Mention the way in which light bulbs are connected in the home. (Give reasons)

.....

.....

4 A) Give a reason for each of the following:

(5 marks)

1. The glass bulb of the electric lamp contains inert gas instead of air.
.....
2. It is advisable not to insert metal objects inside the electric socket.
.....
3. The existence of conducting points at the ends of the fluorescent lamp.
.....
4. It is advisable not to place flammable substances beside electric devices that produce heat.
.....

B) Put (✓) or (X) in front of each of the following sentences:

1. The light intensity increases in the case of series connection. ()
2. The electric circuit is an open path through which the electric current passes. ()
3. The electric fire happens when the human body touches an electric device that produces heat. ()
4. Copper is a good conductor of electricity. ()
5. The electric shock may cause death. ()
6. A wooden bar is used to push the injured during electric accidents. ()

(Total mark: 20)

Test 2

1 A) Correct the underlined words in the following sentences:

(5 marks)

1. The light intensity of electric lamps decreases by increasing their number when being connected in parallel.
2. Electricity is safe when we deal with it carelessly.
3. A person suffering from an electric shock is isolated from the electric circuit by an iron bar.
4. Water is not used in putting out electric fires because it is a bad conductor of electricity.

B) What is the importance of each of the following?

1. Covering power cables with insulating substances.
.....
2. The presence of a battery in the electric circuit.
.....

2 A) Put (✓) or (X) in front of each of the following sentences:

(5 marks)

1. All the gaseous lamps contain neon gas. ()
2. There is only one type of bases for the regular electric bulb. ()
3. Among safety precautions when dealing with electricity is not leaving electric wires uncovered. ()
4. The electric shock causes damage to the body tissues. ()

B) Compare between connecting in series and connecting in parallel.

P.O.C	Connecting in series	Connecting in parallel
1. Way of connection		
2. Light intensity		
3. The effect of burning or unscrewing any of lamps		



Worksheets & Exams

3 A) What happens in the following cases?

(5 marks)

1. Using a filament of lead in the regular bulb.

.....

2. Connecting the electric lamps in series connection.

.....

3. The absence of mercury vapor in the fluorescent lamp.

.....

B) Give a reason for each of the following:

1. There is a glass bulb around the filament.

.....

2. The presence of the battery in the electric circuit.

.....

4 A) Complete the following sentences:

(5 marks)

1. and are examples of electric insulators.

2. The simple electric circuit consists of and

3. The electric overload is the reason of

4. The damage caused by electricity and destroying the body tissues is called

B) What is the function of each of the following?

1. Conducting points in the fluorescent lamp.

.....

2. Tungsten filament.

.....

3. The electric switch in the electric circuit.

.....

Halfway Exams

Answer Guide P. 20

Exam 1

1 A) Choose the correct answer:

- First class levers are different from second class levers in terms of
 a. the absence of the force b. the presence of the fulcrum
 c. the position of the fulcrum d. no correct answer
- Which of the following is a second class lever? -
 a. Sweet holder b. Wheelbarrow c. Seesaw d. No correct answers
- Which of the following levers has their force located between resistance and fulcrum?
 a. Nutcracker. b. Scissors. c. Sweet holder. d. No correct answers.
- Which of the following is found in the fluorescent lamp and not found in the glowing lamp?
 a. Neon gas. b. Argon gas. c. Mercury vapor. d. No correct answers.
- It is preferable to use tungsten in making electric bulbs because it
 a. has a low melting point b. is a bad conductor of electricity
 c. has a high melting point d. no correct answer
- When an electric lamp is connected in series with other lamps in an electric circuit, what will happen to the rest of the lamps? The rest of the lamps
 a. will decrease in light intensity b. will increase in light intensity
 c. will turn off d. no correct answers

B) What is meant by ...?

- Electric insulators.
- Lever.
- Electric fires.
- Simple electric circuit.

2 A) Give a reason for each of the following:

- Levers are important in our daily lives.

- Tungsten is used in making the filament of the electric lamp.

- Electric lamps are connected in parallel in the house.



Worksheets & Exams

4. Water is not used in putting out electric fires.

5. Using a wooden bar to push persons suffering from the electric shock.

B) Mention the reasons for the electric shock.

3 A) Compare between each two of the following:

1.	Connecting lamps in series	Connecting lamps in parallel
2.	First class levers	Third class levers
3.	Electric conductors	Electric insulators

B) Mention some of the safety precautions that should be taken when dealing with electricity.

4 A) Put (✓) or (X) in front of the following sentences:

- The fulcrum of a lever is always between force and resistance. ()
- The third class levers always save effort. ()
- The fulcrum in scissors lies between force and resistance. ()
- If the resistance arm is longer than the effort arm, then the lever saves effort. ()
- The spiral base of the light bulb glows due to passing the electric current through it. ()
- Electric insulators allow the flow of electric current through them. ()

B) Calculate the length of the resistance arm that regains the balance of the lever if you know that the length of the force arm is 2 cm, the hanging force is 8 Newton and resistance is 4 Newton.

Exam 2

1

A) Complete the following statements:

1. Nutcracker is a class lever, while scissors are a class lever.
2. Fluorescent lamps contain inert argon gas and a little amount of
3. Impure water cannot be used to put out the fire resulting from
4. The scientist is the first one who invented the light bulb, whose filament is made of
5. leads to destroying the tissues of the body.

B) What happens when ...?

1. The arm of resistance is longer than the arm of force of a lever.
.....
2. Connecting more than one lamp in an electric circuit in parallel.
.....

2

A) Put (✓) in front of the correct statements and (X) in front of the incorrect ones:

1. Among the functions of levers is to decrease distance. ()
2. The electric shock occurs as a result of the passing of the electric current through the wires. ()
3. Crowbar is an example of the first class levers. ()
4. If the arm of the force is smaller than the arm of the resistance, then the lever doesn't save effort. ()
5. Fires resulted from electricity are extinguished by water. ()

B) If the affecting force of a first class lever equals 30 Newton, the length of its arm is 20 cm and the resistance is 20 Newton, what is the length of the resistance arm?

.....

.....

.....



Worksheets & Exams

3 A) Choose the correct answer from those between brackets:

1. The filament of the light bulb is made of (iron - tungsten - copper)
2. Which of the following levers is saving effort? -
(Sweet holder - Fishing rod - Wheelbarrow)
3. From the insulators of electricity is (rubber - aluminum - copper)
4. From the first class levers is
(scissors - nutcracker - manual broom)
5. When the electric lamp is connected in series with others in the electric circuit, the light intensity (decreases - increases - doesn't change)

B) Mention one function for the base of the light bulb, and mention its type.

.....

4 A) Write the scientific term for the following statements:

1. Materials that allow for the flow of electricity through them. (.....)
2. The distance between the force and fulcrum. (.....)
3. One of the dangers of electricity causing damage to the tissues of the body. (.....)
4. A tool used to convert the electric energy to light energy. (.....)
5. The fixed point of a rigid bar. (.....)

B) Give a reason for each of the following:

1. The electric heater cannot be placed next to the furniture during operation.

2. The filament of the electric bulb is made of tungsten.

Exam 3

1 A) Choose the correct answer from those between brackets:

1. Which of the following gases is found in the fluorescent lamp but not in the light bulb? - (Argon gas - Neon gas - Mercury vapor)
2. Among the examples of electric insulators is (copper - wood - iron)
3. From the first class levers is (nutcracker - sweet holder - scissors)
4. Which lever saves more effort? - (Crowbar - Nutcracker - Fish hook)
5. is a bad conductor of electricity. (Iron - Plastic - Copper)

B) In the second class lever, the effort force is 50 Newton and force arm is 20 cm. If the resistance force arm is 5 cm, calculate the value of the resistance force.

.....

.....

.....

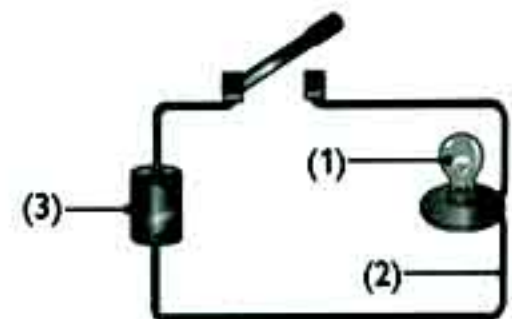
2 A) Complete the following statements:

1. The simple electric circuits consists of, a lamp and
2. Nutcracker is considered a class lever.
3. A fluorescent lamp contains gas and a little amount of
4. An example of levers used to increase the speed is
5. The filament of the light bulb is made of because it has high

B) The opposite figure represents

- Write the labels:

- (1)
- (2)
- (3)



3 A) Write the scientific term:

1. Materials that do not allow the electricity to flow through. (.....)
2. The way of connecting electric lamps where the intensity of the light of lamps decreases with the increase in their number. (.....)



Worksheets & Exams

3. One of the dangers of electricity that causes body tissues damage. (.....)
4. The simple machines act as effort saving. (.....)
5. A tool used to convert the electric energy to light energy. (.....)

B) What happens if ...?

1. You place the electric heater too close to furniture and rugs.

2. The force arm is longer than the resistance arm.

4 A) Correct the underlined words:

1. The third class levers always save effort.
2. The human body is a good conductor of electricity as it contains gases.
3. The light bulbs are connected in series in the house.
4. Nutcracker is considered a first class lever.
5. A glass bulb contains an active gas to increase the life of the filament.

B) Give a reason for each of the following:

1. Water cannot be used to turn off the electric fires.

2. The second class levers conserve effort.

Unit 3 The Universe

Lesson 1

The solar eclipse

Answer Guide P. 21

Worksheet 9

1 A) Complete the following sentences:

1. The solar eclipse is formed when lies between the Sun and on one
2. is a dark inner shadow in which the total solar eclipse occurs..
3. The rotates around the Earth in orbit.
4. The Sun emits rays which is harmful to the eyes such as and

B) What is meant by ...?

1. Umbra.

.....

2. Penumbra.

.....

2 A) Choose the correct answer:

1. Sunlight travels in lines so it casts a shadow of the dark bodies in its way.
 - a. carved
 - b. zigzag
 - c. straight
 - d. no correct answers
2. The solar eclipse occurs when the Earth is lined with the Moon and the
 - a. Earth is between the Moon and the Sun
 - b. Moon is between the Earth and the Sun
 - c. Sun is between the Moon and the Earth
 - d. no correct answers
3. The is the phenomenon of through which the sunlight is blocked by the Moon from reaching the surface of the Earth.
 - a. solar eclipse
 - b. lunar eclipse
 - c. rainbow
 - d. all the previous answers



Worksheets & Exams

B) What happens if ...?

1. An object is put between a light source and a screen.

.....

2. The Moon lies between the Sun and the Earth on one straight line.

.....

3 A) Write the scientific term for each of the following:

1. A natural phenomenon where the Moon lies between the Earth and the Sun on the same straight line.

(.....)

2. The area in which some light reaches the Earth, while the rest is blocked.

(.....)

3. The area where the light is blocked totally due to the presence of a dark object in the path of light.

(.....)

B) Mention the safety precautions during the solar eclipse.

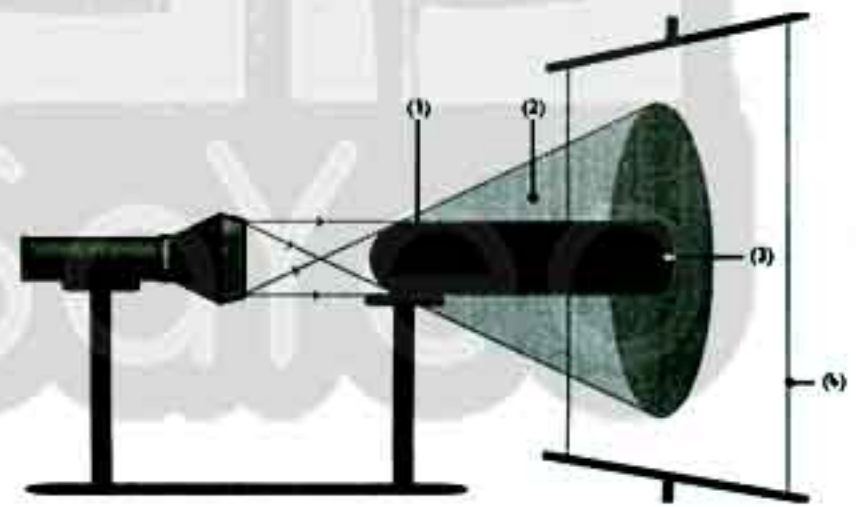
.....

.....

.....

4 A) Label the opposite figure:

1.
2.
3.
4. The screen represents



B) Give a reason for each of the following:

1. The occurrence of solar eclipse phenomenon.

.....

2. The distance between the Moon and the Earth varies during rotation.

.....

Worksheet 10

1 A) Put (✓) or (X) in front of the following sentences:

1. The solar eclipse occurs when the Moon casting its shadow on part of the Earth's surface. ()
2. Shadow is the lighting area where the total solar eclipse occurs. ()
3. We can look directly at the Sun during solar eclipse using sunglasses. ()
4. Both ultraviolet and infrared rays are useful for man. ()
5. There are two types of solar eclipse. ()

B) Compare between total solar eclipse and partial solar eclipse:

Total solar eclipse	Partial solar eclipse
.....
.....
.....

2 A) Choose the correct answer:

1. In the semi-shaded area of the Moon, we can see a part of the Sun forming what is known as the
 a. total solar eclipse b. partial solar eclipse
 c. lunar eclipse d. annular solar eclipse
2. The type of eclipse differs according to the movement of in front of the Sun.
 a. Earth b. Mercury
 c. Moon d. Mars
3. The duration of the solar eclipse doesn't exceed
 a. three minutes and few seconds b. seven minutes and few seconds
 c. two hours and few minutes d. two days and few hours

B) Give a reason for the following:

1. Special glasses are used to observe the solar eclipse.



Worksheets & Exams

2. The type of solar eclipse differs according to the movement of the Moon in front of the Sun.

3. We can't see the Sun completely during the total solar eclipse.

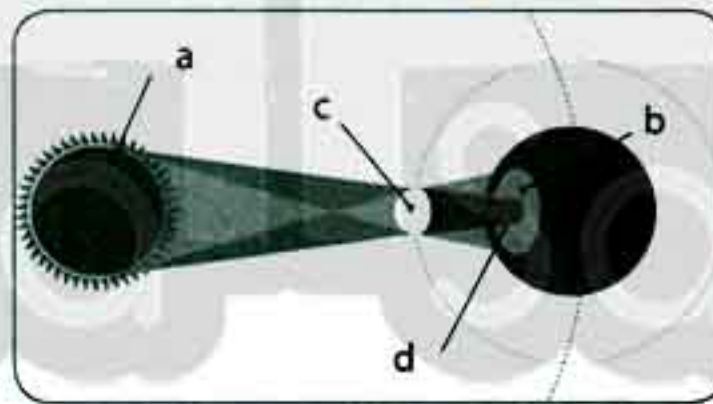
3 A) Correct the underlined words:

1. We see a partial solar eclipse when the Earth lies in the umbra area of the Moon.
2. Partial solar eclipse occurs when the Moon's cone shadow umbra doesn't reach the Earth's surface.
3. To observe the solar eclipse safely you should wear lenses.

B) What happens if ...?

1. We used special sight devices such as a telescope to see the solar eclipse.
2. There is a dark body between the Sun and the Earth.

4 A) Notice the following figure: label the letters on the drawing and explain the reason for the occurrence of the solar eclipse:



a.

b.

c.

d.

The reason:

B) Write the scientific term for each of the following:

1. The harmful rays emitted from the Sun during the solar eclipse. (.....)
2. A part of the human eye that is harmed when looking directly at the Sun. (.....)

Lesson 2

The lunar eclipse

Answer Guide P. 21

Worksheet 11

1 A) Give a reason for each of the following:

1. The occurrence of the total lunar eclipse.

.....

2. The Moon tends to be red at the beginning of the eclipse.

.....

3. We don't have to follow safety precautions when looking at the Moon during the lunar eclipse.

.....

B) Complete the following sentences:

1. is the phenomenon that happens when the Earth comes between the Sun and the Moon.

2. The lunar eclipse occurs in the of the lunar month when the Moon phase is

3. The types of the lunar eclipse are and

4. Total lunar eclipse occurs when the Moon falls in the area of the Earth.

2 A) Choose the correct answer in the following sentences:

1. During the partial lunar eclipse, the Moon appears as

(a red disc – an incomplete disc – a dark disc)

2. The lunar eclipse is formed when the whole Moon falls in the umbra area of the Earth.

(total – partial – no correct answers)

3. The lunar eclipse occurs at the of the lunar month.

(beginning – middle – end)

B) Correct the underlined words:

1. The lunar eclipse lasts for about 30 minutes.2. The partial lunar eclipse occurs when the Moon lies totally in the penumbra of the Earth.

Worksheets & Exams

3 A) Compare between solar eclipse and lunar eclipse in the following table:

Points of comparison	Solar eclipse	Lunar eclipse
1. Reasons
2. Harm

B) What happens when ...?

1. The Earth comes between the Sun and the Moon on one straight line.

.....

2. The whole Moon enters the semi-shaded area of the Earth.

.....

4 A) Define:

1. Lunar eclipse.

2. Total lunar eclipse.

3. Partial lunar eclipse.

B) The following figure represents lunar eclipse phenomenon, observe it, then answer the questions:

1. What is the name of the astronomical phenomenon shown in the following figure?

.....



2. What happens when ...?

(a) the whole Moon enters the penumbra area

(b) the whole Moon enters the umbra area

Worksheet 12

1 A) Complete the following statement:

- occurs when the comes between the Sun rays and a part or the whole of the Moon.
- The Moon tends to be red at the start of eclipse.
- eclipse doesn't harm the eye, while eclipse harms the eye.

B) Write the scientific term for each of the following:

- The phenomenon that occurs when the whole Moon enters the shadow area of the Earth. (.....)
- The phenomenon which occurs when a part of the Moon enters the shadow area of the Earth. (.....)
- The phenomenon that can be seen from any place on the Earth at the same time. (.....)

2 A) Choose the correct answer:

- The is formed when the Sun, the Earth and the Moon are nearly on one straight line with the Earth in the middle.

a. solar eclipse	b. annular solar eclipse
c. lunar eclipse	d. no correct answers
- The lunar eclipse happens times per year.

a. 2	b. 3	c. 5	d. 10
------	------	------	-------
- The lunar eclipse occurs when the Moon's phase is

a. full Moon	b. crescent
c. new Moon	d. all the previous answers

B) Put (✓) or (X):

- The two phenomena of the lunar eclipse and the solar eclipse are repeated regularly and can be predicted. ()
- The lunar eclipse can be seen with the naked eye. ()
- The duration of the lunar eclipse doesn't exceed seven minutes and few seconds. ()



Worksheets & Exams

3 A) Correct the underlined words:

1. The only time the lunar eclipse occurred 5 times was in 1982.
2. The time of the lunar eclipse is less than that of the solar eclipse.
3. The solar eclipse happens when the Earth lies between the Moon and the Sun.

B) Give a reason for each of the following:

1. No annular lunar eclipse is formed like the annular solar eclipse.
.....
2. The lunar eclipse occurs in the middle of the lunar month.
.....
3. Although the lunar and the solar eclipses attract people's attention, they don't affect the life on the Earth.
.....

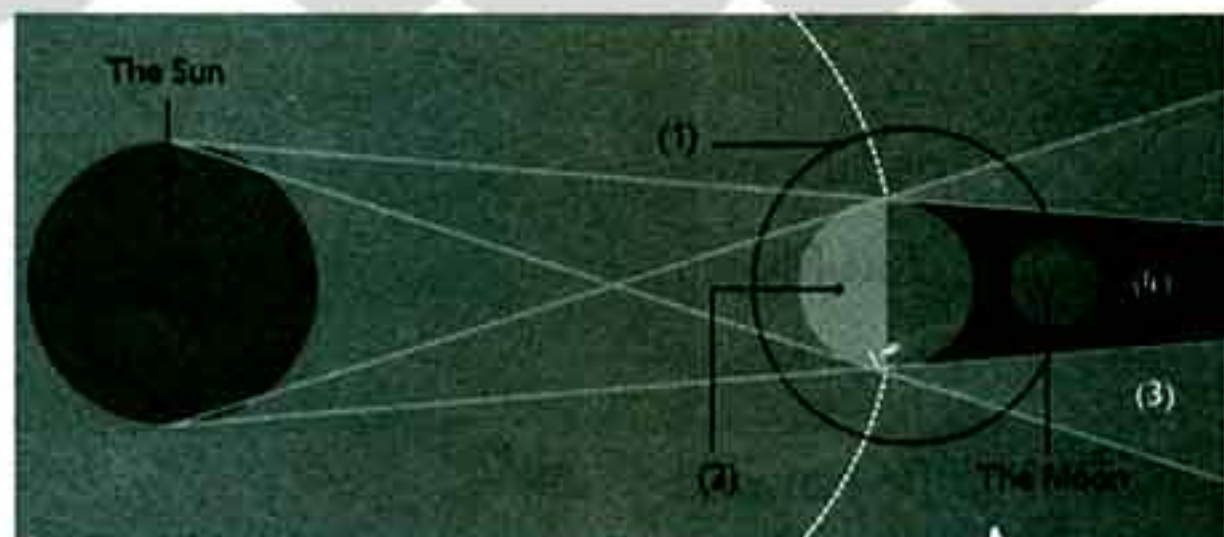
4 A) What happens when ...?

1. A part of the Moon enters the shadow area of the Earth.
.....
2. The Earth blocks the sunlight from reaching the whole Moon.
.....

B) The following figure represents lunar eclipse phenomenon, observe it, then complete the following:

1. The type of lunar eclipse is
2. Label the figure:

1.
2.
3.
4.



School BOOK Exercises

on Unit 3

Answer Guide P. 22

1 Justify (Give reasons):

1. We should not look at the Sun with the naked eye.
.....
2. The type of the solar eclipse differs due to the movement of the Moon in front of the sun .
.....
3. No annular lunar eclipse is formed like the annular solar eclipse.
.....
4. We cannot see the Sun completely during the total solar eclipse.
.....

2 Complete the following sentences:

1. The phenomenon occurs continuously when the hides the sunlight during its pass in front of it from a part of the Earth.
2. occurs when the comes between the Sun rays and a part of the Moon or the whole Moon.
3. A solar eclipse is formed when the moon is located in an orbit higher than the earth.

3 Put (✓) in front of the correct statements and (X) in front of the false ones and correct the false ones:

1. Since the past, man has been observing the stars and planets. He managed to develop some accurate calculations of their movement in space. ()
2. On the contrary of the solar eclipse, the lunar eclipse can be easily seen from the surface of the Earth with the naked eye. ()
3. More than one type of the solar eclipse can be observed. ()

Worksheets & Exams

4 Define the following terms:

1. Cone umbra.

.....

2. The penumbra.

.....

3. Total solar eclipse.

.....

4. Partial solar eclipse.

.....

5. Total lunar eclipse.

.....

5 Compare between each of the following:

1. Solar and lunar eclipses.

2. Total solar eclipse and annular solar eclipse.

6 Mention the scientific term:

1. It occurs to the Moon when it completely enters the shadow area of the Earth.

(.....)

2. It occurs when the Moon enters the semi-shadow area.

(.....)

3. It occurs when the Earth comes between the Moon and the Sun on one straight line.

(.....)



GEM

General Tests on Unit

3

Answer Guide P. 22
(Total mark: 20)

Test 1

1 A) Complete the following sentences:

(5 marks)

1. The phenomenon of is formed when blocks sunlight from reaching a part of the Earth's surface when passing in front of the Sun.
2. The phenomenon of is formed when lies between sunlight and a part or all of the Moon.
3. The Moon revolves around the Earth in a/an orbit.
4. The types of the lunar eclipse are and
5. A solar eclipse is formed when the Moon is in a higher orbit away from the Earth .

B) Compare between: Total lunar eclipse and partial lunar eclipse.

.....

.....

2 A) Put (✓) or (X) in front of the following sentences:

(5 marks)

1. It is not necessary to use special sunglasses to watch the solar eclipse. ()
2. The lunar eclipse occurs during day. ()
3. The lunar eclipse can be easily seen with the naked eye, whereas solar eclipse cannot be seen with the naked eye. ()
4. We can notice more than one type of the lunar eclipse. ()

B) What happens in the following cases?

A part of the Moon falls in the umbra area of the Earth.

.....

3 A) Give a reason for each of the following:

(5 marks)

1. The Moon doesn't have annular eclipse.
.....
2. We must not watch the solar eclipse with the naked eye.
.....
3. Watching the lunar eclipse does not require safety precautions.
.....



GEM / Science / Primary 6

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هذا العمل خاص بموقع ذاكرولي التعليمي ولا يسمح بتداوله على مواقع أخرى

Worksheets & Exams

B) What is meant by ...?

1. Umbra.

.....

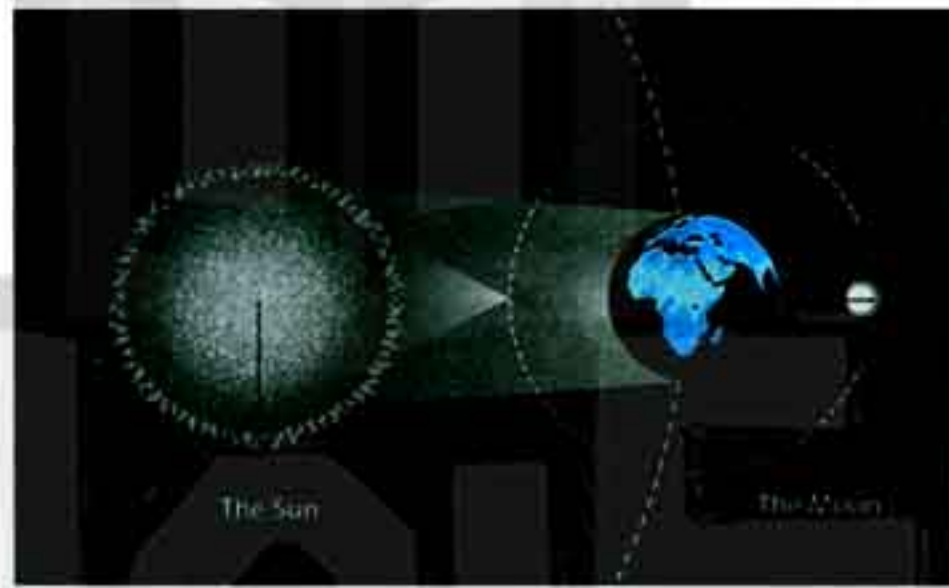
2. Penumbra.

.....

4 A) The following figure represents lunar eclipse phenomenon, observe it, then answer the questions: (5 marks)

1. What is the name of the astronomical phenomenon shown in the following figure?

.....



2. What happens when ...?

(a) the whole Moon enters the penumbra area.

(b) the whole Moon enters the umbra area.

B) Write the scientific term for each of the following:

1. A natural phenomenon that occurs in the middle of the lunar month.

(.....)

2. A dark area where no light reaches the Earth at all.

(.....)

3. It occurs when the whole Moon enters the shadow area of the Earth.

(.....)

4. Harmful rays emitted from the Sun during the solar eclipse.

(.....)

(Total mark: 20)

Test 2

1 A) Choose the correct answer:

(5 marks)

- During the start of the lunar eclipse, the color of the Moon tends to be
a. red b. orange c. yellow d. green
- When a part of the Moon enters the umbra area of the Earth,
a. the partial lunar eclipse is formed b. the total lunar eclipse is formed
c. the partial solar eclipse is formed d. the total solar eclipse is formed
- In the shadow area of a tree, you feel
a. hotter b. moderately hot c. colder d. no correct answers
- The lunar eclipse occurs at the
a. middle of the lunar month b. beginning of the lunar month
c. first 3 days of the month d. end of the lunar month

B) Give a reason for each of the following:

- The lunar eclipse can be seen easily from the Earth's surface.
.....
- The formation of the solar eclipse.
.....
- When the Moon enters the penumbra area of the Earth, this is not considered an eclipse.
.....

2 A) Write the scientific term for each of the following:

(5 marks)

- The area that appears between the lighted area and the real shadow area and we can see a part of the lighted source if we stand in this area. (.....)
- Eclipse doesn't require precautions to look at it. (.....)
- The lunar eclipse in which the whole Moon lies in the umbra area of the Earth. (.....)
- The natural phenomenon that is formed when the Moon lies between the Earth and the Sun on the same straight line. (.....)



Worksheets & Exams

B) Why doesn't the Moon have an annular eclipse like the Sun?

3 A) Complete the following sentences:

(5 marks)

1. The lunar eclipse is formed in the middle of
2. The lunar and solar eclipses are phenomena.
3. Doctors warn us from directly at the Sun.
4. There are two types of the lunar eclipse which are and

B) Mention the conditions of each of the following:

1. The formation of the lunar eclipse.

.....

.....

2. The formation of the solar eclipse.

.....

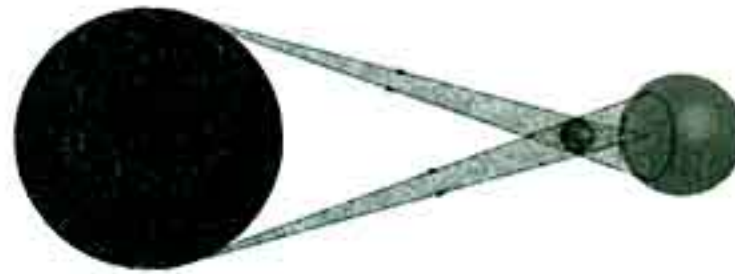
.....

4 A) Put (✓) or (X) in front of the following sentences:

(5 marks)

1. The total lunar eclipse is a natural phenomenon that occurs when the whole Moon lies in the umbra area of the Earth. ()
2. The lunar eclipse occurs during day. ()
3. The Moon rotates around the Earth in an oval orbit. ()
4. We can look at the Sun during the solar eclipse because it shines weakly. ()
5. The types of the solar eclipse differ according to the movement of the Earth in front of the Sun. ()

B) Write down the phenomenon indicated by the Sun in the following figures and explain why it is formed:



.....

.....

.....

Unit 4 Structure and Function of Living Organisms

Lesson 1

Absorption and transmission of water and mineral salts in plants

Answer Guide P. 23

Worksheet 13

1 A) Complete the following sentences:

1. During the photosynthesis process, plants absorb gas and release gas.
2. is the external layer that the root hair extends from.
3. Green plants consist of two main parts which are and
4. layer follows the epidermis and its last row is called

B) Put (✓) or (X):

1. The cell membrane of the root hair has the osmosis property which allows only some salts to pass through. ()
2. The stem extends and penetrates the soil to increase the absorption process. ()

2 A) Write the scientific term for each of the following:

1. The losing of water in the shape of water vapor from plant leaves. (.....)
2. The gas that plants produce during the photosynthesis process. (.....)
3. A property where water transfers from an area of high concentration of water to an area of low concentration of water through semi-permeable membrane. (.....)
4. The plant part that penetrates the soil particles and fixes it. (.....)

B) Mention the conditions necessary for plant to make the photosynthesis process.

.....

.....



Worksheets & Exams

3 A) Give a reason for each of the following:

1. The root of the plant is branched and extended through the soil particles.

.....

2. Light is important for plants.

.....

3. The presence of highly concentrated sap vacuole in root hairs.

.....

B) Identify the following figure, and then label its parts:

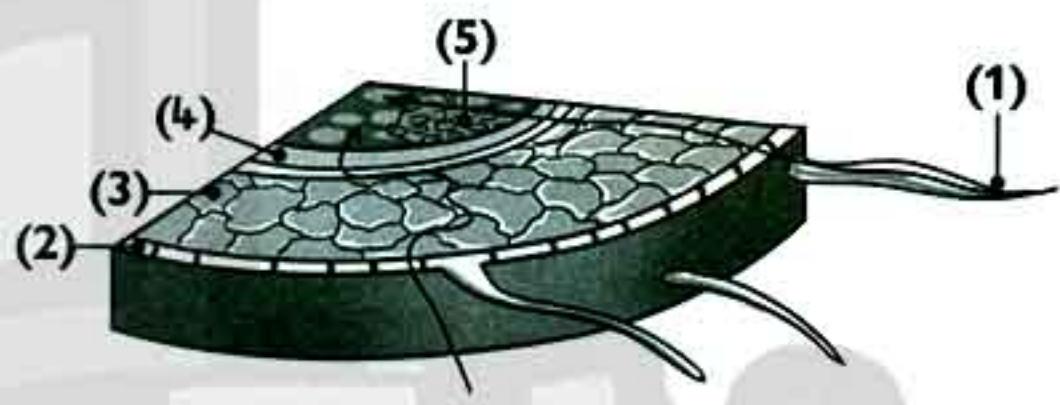
1.

2.

3.

4.

5.



4 A) What is meant by ...?

1. Selective permeability.

.....

2. Osmosis.

.....

B) What are the functions for each of the following?

1. The root system.

.....

2. The guard cell in the plant's leaves.

.....

Worksheet 14

1 A) Complete the following:

1. Stomata are found in large numbers on the surface of the leaf.
2. is transmitted from the soil by feature from an area of concentration of water to an area of concentration of water.
3. The outer layer of root is called, while the innermost layer is called
4. Plants lose water in the form of through openings called during process.

B) Mention one function for each of the following:

1. Xylem.
2. Endodermis layer.

2 A) Choose the correct answer:

1. Root hair absorbs water from the soil by means of property.
a. photosynthesis b. selective permeability c. osmosis
2. gas is important for the plant during the photosynthesis process.
a. Oxygen b. Carbon dioxide c. Nitrogen
3. regulates the passage of water to xylem vessels.
a. Epidermis b. Endodermis c. Root hair
4. Plants can't carry out the photosynthesis process in the absence of gas.
a. oxygen b. nitrogen c. carbon dioxide

B) What is meant by ...?

- Osmosis feature.

3 A) Match words from (A) with the suitable sentences from (B):

(A)	(B)
1. Root hair	a. a structure in the plant that transfers water from the root to the stem.
2. Selective permeability	b. the loss of excessive water in plants through openings located on the lower and upper surface of leaves.
3. Xylem	c. an extension from the root that absorbs water.
4. Transpiration process	d. the process by which plants make their own food.
	e. a property where the root hair allows certain salts to pass through according to the need of the plant.

1.
2.
3.
4.



Worksheets & Exams

B) What happens when ...?

1. There are no stomata in the plants' leaves.

.....

2. There is no osmosis feature in the plant.

.....

4 A) Put (✓) or (X) in front of the following sentences:

1. Each stoma is surrounded by a guard cell that changes its shape to open and close the stoma. ()
2. The endodermis layer regulates the passing of water to the xylem. ()
3. The root extends and penetrates the soil to absorb water. ()
4. Green plants need light, water and carbon dioxide to make the photosynthesis process. ()

B) Give a reason for each of the following:

1. The cell membrane of root hairs has a selective permeability property.
-
2. The concentration of solution inside the root hair vacuole is higher than the concentration of solution in the soil.
-

Rania Sayed



GEM

General Tests on Unit

4

Answer Guide P. 24

(Total mark: 20)

Test 1

1 A) Write the scientific term for each of the following:

(5 marks)

1. The vital process by which green plants make their own food. (.....)
2. Losing of water in the form of water vapor from the plants' leaves through stomata. (.....)
3. The innermost layer of the plant's root. (.....)
4. Small openings on the plants' leaves. (.....)

B) Give a reason for each of the following:

1. The formation of water drops on the inner walls of the glass jar covering a leafy plant.
.....
2. The presence of two guard cells on the stoma.
.....

2 A) Complete the following sentences:

(5 marks)

1. gas is produced during the photosynthesis process.
2. system of the plant is found above the soil.
3. Green plants need,, and to carry out the photosynthesis process.

B) Compare between the photosynthesis process and the transpiration process.

Photosynthesis process	Transpiration process
.....
.....
.....



GEM / Science / Primary 6

55

Worksheets & Exams

3 A) Choose the correct answer:

(5 marks)

- The root system consists of
 a. cortex b. epidermis c. xylem and pitch d. all the previous answers
- Stomata are largely found on the
 a. roots b. stem c. leaves d. flowers
- The process in which water gets through the leaves in the form of vapor is called
 a. respiration b. transpiration
 c. absorption d. photosynthesis
- The plant gets mineral salts through
 a. selective permeability property b. osmosis property
 c. imbibition d. transpiration

B) Arrange the layers of the root from inside to outside:

(Xylem – Cortex – Pith – Endodermis – Epidermis)

.....

.....

4 A) Correct the underlined words in the following sentences:

(5 marks)

- Stomata are found in large numbers on the plant's stem.
- Plants produce oxygen gas during respiration.
- Plant stomata are surrounded by woody cells.
- Respiration process helps lifting the water up the plant.

B) What is meant by ...?

- Selective permeability.

.....

.....

- Osmosis feature.

.....

.....

(Total mark: 20)

Test 2

1 A) Choose the correct answer:

(5 marks)

- Plant absorbs water by
 a. flowers
 b. root hairs
 c. stem
 d. leaves
- Water is transferred from the root to the stem through the
 a. cortex
 b. epidermis
 c. xylem
 d. guard cell
- The part which is responsible for absorbing water and mineral salts from the soil is the
 a. root hair
 b. stem
 c. leaves
 d. buds
- The membrane of the root hair is
 a. permeable
 b. semi-permeable
 c. impermeable
 d. transparent

B) Compare between the root system and shoot system of the plant.

Root system	Shoot system
.....
.....

2 A) Complete the following sentences:

(5 marks)

- is found on the two sides of the stoma.
- Transpiration is a process through which the plant loses in the form of
- Plants carry out to make their own food.
- and are among the mineral salts necessary for the life of a plant.

B) Give a reason for each of the following:

- Light is important for the plant.

- The cell membrane of the root hair has a selective permeability property.



Worksheets & Exams

3 A) Write the scientific term for each of the following:

(5 marks)

1. The layer that follows the epidermis layer. (.....)
2. The part of a plant that penetrates the soil particles and fixes it. (.....)
3. Two cells located on the sides of the stomata and control their opening and closing. (.....)

B) Look at the figures, and then answer:

Fig. (a) represents

Fig. (b) represents

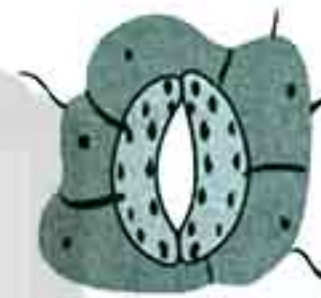


Fig (a)

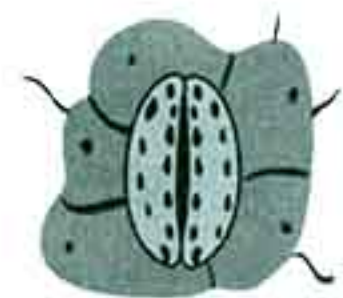


Fig (b)

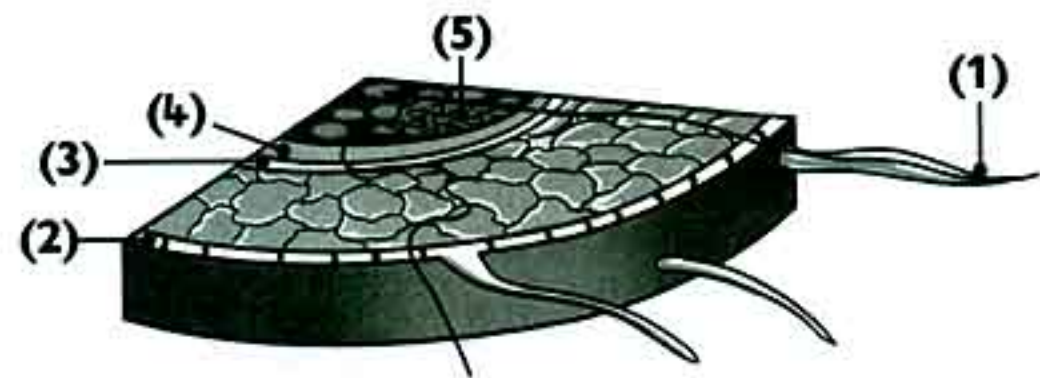
4 A) Put (✓) or (X) in front of the following sentences:

(5 marks)

1. The number of stomata on the upper surface of a leaf is bigger than on the lower surface. ()
2. Transpiration lifts up water in the xylem vessels from the roots to the stem. ()
3. Transpiration is the process through which the plant loses water in the form of drops. ()
4. The root carries out the transpiration process. ()

B) Look at the following figure, write down the labels on the drawing:

1.
2.
3.
4.
5.



Worksheets & Exams

School Exams on the Second Term

2018/2019

(Answer Guide P. 24)

Note: The questions marked by (★) are modified to the latest MOE on curriculum.

1 Cairo - Shoubra Educational Directorate

1 A) Choose the correct answer:

1. Which of the following gases is found in the fluorescent lamp but not in the light bulb? -
 - a. Argon gas.
 - b. Neon gas
 - c. Mercury vapor
2. Electric wires are covered with
 - a. copper
 - b. plastic
 - c. aluminum
3. is/are considered first class lever.
 - a. Wheelbarrow
 - b. Pliers
 - c. Manual broom
4. The duration of the solar eclipse does not exceed
 - a. 5 minutes
 - b. 7 seconds and few minutes
 - c. 7 minutes and few seconds

B) Correct the underlined words:

1. Human body is a good conductor of electricity as it contains gases. (.....)
2. Second class levers sometimes conserve effort. (.....)
3. Partial solar eclipse occurs when the Moon's cone shadow (umbra) does not reach Earth's surface. (.....)
4. Newton was the first scientist who described the levers. (.....)
5. ★ Stoma is surrounded by two wooden cells. (.....)

2 A) Put (✓) or (X):

1. In the start of the total lunar eclipse, the color of Moon tends to be red due to the red rays that can be absorbed from above the atmosphere of Earth. ()
2. The phenomenon of solar and lunar eclipse attracts people's attention because it affects life on Earth. ()
3. When the whole Moon enters the semi-shaded area of Earth, the Moon seems without eclipse. ()
4. Fire result from electricity is extinguished by sand. ()
5. ★ The root extends and penetrates the soil to absorb water. ()

B) Complete the following table:

P.O.C	Solar eclipse	Lunar eclipse
Reason
Time of occurrence

3. A third class lever with a force arm of length 2 cm, and the length of the arm of the resistance is 6 cm. If the resistance has a value of 20 Newton, calculate the value of the affecting force and mention if this lever conserves effort or not. And why?

3 A) Complete the following sentences:

1. Filament of light bulb is made of and that is because its is high.
2. From examples of levers that are used to avoid dangers are and
3. eclipse occurs when the is located between the Sun and Earth.

B) Mention one function of:

1. Tweezers:
2. The points of connection in the fluorescent lamp:
3. Stomata:

C) In the following figure, answer the following questions:

- a. The electric circuit is circuit.
- b. What is the way of connection if three lamps are connected one after the other in one route in this circuit?



4 A) Write the scientific term in front of the following:

1. Levers that have the resistance between the fulcrum and effort force. (.....)
2. One of the dangers of electricity that causes damage of body tissues. (.....)
3. It is the force exerted by a person to equilibrate the resistance. (.....)
4. Type of solar eclipse in which we can't see the Sun completely. (.....)

B) Give a reason for each of the following:

1. We shouldn't look directly at the Sun with the naked eye during the solar eclipse.
2. Plugging more than one machine to one socket causes electric fire.
3. ★ The concentration of salt solution inside the vacuole is greater than the concentration of salt solution in the soil.

C) What happens when ...?

1. You insert a metallic bar in an electric socket.
2. The Moon lies in a higher orbit from the Earth.

Worksheets & Exams

2 Cairo - Educational Zone - Official Language Schools

1 A) Complete the following sentences:

1. Manual broom is considered a class lever, but the crowbar is a class lever.
2. The type of levers that always do not conserve effort is, while the type of levers that always conserve effort is
3. The filament of the light bulb is made of and that is because it has high
4. The electric shock occurs as a result of passing through the
5. ★ phenomenon always occurs when blocks the sunlight from reaching a part of the Earth.

B) Give a reason for each of the following:

1. There are two pieces of lead in the light bulb.
.....
2. Plugging more than one machine to one socket causes electric fires.
.....
3. ★ The presence of stomata on the lower surface of the plant leaves.
.....

2 A) Write the scientific term in front of the following:

1. A rigid bar that rotates around a fixed point and is affected by a force and a resistance. (.....)
 2. Levers that sometimes conserve the effort. (.....)
 3. One of the dangers of electricity is causing the damage of tissues of the body. (.....)
 4. It occurs to the Moon when it completely enters the umbra area of the Earth. (.....)
 5. A way of connecting light bulbs in branching routes. (.....)
 6. Levers in which the resistance force lies between the effort force and the fulcrum. (.....)
- ★ A 2nd class lever of force 100 Newton, its force arm of length is 25 cm and its resistance is 500 Newton; calculate the resistance arm.
.....
.....

Worksheets & Exams

3 Cairo - El Sherouq Zone - Mena Language School

1 A) Write the scientific terms:

1. Levers that have the force between the resistance and the fixed point. (.....)
2. Means of converting the electric energy to light energy. (.....)
3. One of the dangers of the electricity is that it destroys the tissues of the body. (.....)
4. It occurs when the Moon comes between the Earth and the Sun on one straight line. (.....)
5. ★ A vital process carried out by the plant to produce its own food. (.....)

B) The force affecting a second class lever equals 200 Newton and the length of its arm is 50 cm and a resistance with a value of 1000 Newton, calculate the value of the arm of the resistance.

.....

.....

.....

2 A) Complete the following sentences:

1. and are examples of the first class levers.
2. The law of levers states that
3. The fluorescent lamp contains gas.
4. and are examples of materials that are electric conductors.

B) Compare between the solar eclipse and the lunar eclipse:

Solar eclipse	Lunar eclipse
.....
.....
.....
.....
.....
.....
.....

3 A) Give a reason for:

1. There are two pieces of lead in the light bulb.

.....

.....

.....

2. Not placing flammable materials too close to the electric machines that generate heat.

.....

.....

.....

B) Correct the underlined words:

1. The electric lamp converts the electric energy to the kinetic energy. (.....)
2. There are three connecting points at each end of the light bulb ends. (.....)
3. The glass bulb of the electric lamp contains hydrogen gas. (.....)
4. The electric lamps are connected in the house in series. (.....)
5. ★ Leaves extend in the soil and penetrate it to increase the surface area of absorption. (.....)

4 A) Put (✓) or (X):

1. The first class levers has the resistance between the force and the fulcrum. ()
2. More than one type of solar eclipse can be observed. ()
3. The crowbar is an example of the first class levers. ()
4. ★ Plant loses water in the form of water vapor in the photosynthesis process. ()

B) What happens when ...?

1. You make the filament of the light bulb from iron.

.....

.....

2. There is air inside the light bulb.

.....

.....

Worksheets & Exams

4 Giza - Dokki Educational Directorate

1 A) Choose the correct answer:

- Which of the following levers saves effort? -
 a. Scissors b. Nutcracker c. Sweet holder d. Coal holder
- The electric wires must be covered with
 a. glass b. copper c. wood d. plastic
- The phenomenon of the lunar eclipse occurs in the of the lunar month.
 a. middle b. end c. beginning d. quarter
- occur(s) when placing flammable materials near to electric machines that generate heat.
 a. Electric shock b. Electric burn c. Electric fire d. Indirect injuries

B) A first lever is affected by 10 Newton force with an arm of 10 cm length and a resistance of 20 Newton.

- Calculate the length of arm of resistance.

- Does the lever save effort? Why?

C) What happens when ...?

- The whole Moon enters the semi-shaded area of the Earth.

- The filament of the electric lamp is made of iron.

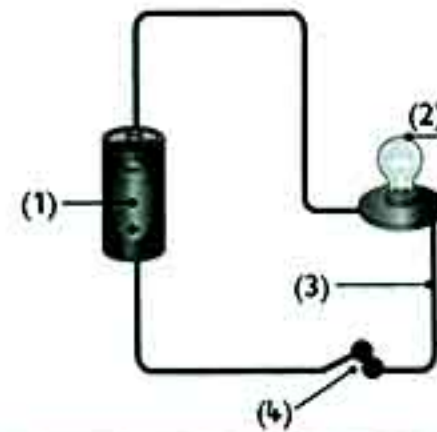
- ★ The cell membrane of the root hairs of the plant is not found.

2 A) Complete the following sentences:

- The crowbar is considered as a class lever, while the nutcracker is considered as a class lever.
- The light bulbs in the house are connected in
- Electric shock occurs as a result of passing through the human body.
- The solar eclipse occurs when the lies between Sun and

B) Write the labels of this figure:

-
-
-
-



C) What is meant by ...?

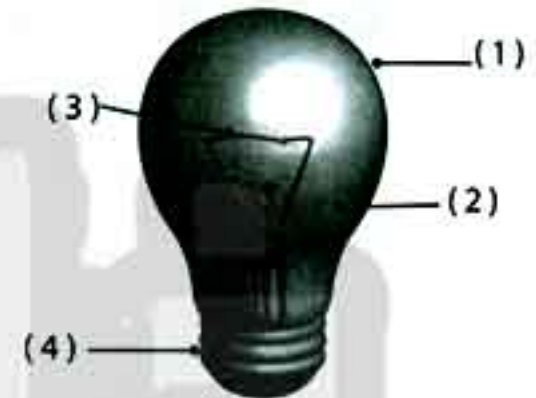
1. Direct injuries:
2. Annular solar eclipse:

3 A) Give a reason for:

1. Water is not used to put out electric fires.
.....
2. There must be a switch in the electric circuit.
.....
3. We should not look at the Sun with the naked eye.
.....
4. The force may be equal to the resistance in the first class levers.
.....

B) Label the opposite figure:

1.
2.
3.
4.



4 A) Write the scientific term for the following:

1. The fixed point on which the lever rotates. (.....)
2. The area that lies between the real shadow area and the lighted area. (.....)
3. Materials that don't allow the electric current to pass through. (.....)
4. A way of connecting the electric lamps in which all the lamps are turned off when one of them burns out. (.....)

B) Correct the mistake in each of the following sentences:

1. Plugging more than one machine to one socket causes electric shock. (.....)
2. A fluorescent lamp contains the inert neon gas. (.....)
3. Special glasses are used to observe the lunar eclipse. (.....)
4. Electric wires are made of plastic. (.....)

C) Complete between the solar eclipse and the lunar eclipse:

P.O.C	Solar eclipse	Lunar eclipse
Duration
Harms

Worksheets & Exams

5 Giza - Giza Educational Administration - Orman Language School

1 A) Complete the following sentences:

1. The nutcracker is a class lever, while the scissors are class lever.
2. The fluorescent lamps contain inert argon gas and a little amount of
3. Impure water cannot be used to put out the fire resulting from
4. The solar eclipse occurs when the comes between the Earth and the Sun on the same straight line.
5. ★ The in plant is surrounded by two guard cells.

B) What happens when ...?

1. The arm of resistance is longer than the arm of force of a lever.
.....
2. Connecting more than one lamp in an electric circuit in parallel.
.....

2 Choose the correct answer:

1. Which of the following gasses is found in the fluorescent lamp but not in the light bulb?
..... (Neon – Argon – Mercury vapor)
2. Which of the following levers has the force between the resistance and the fulcrum?
..... (Nutcracker – Scissors – Sweet holder)
3. class levers never save effort. (First – Second – Third)
4. The filament of the light bulb is made of (iron – copper – tungsten)
5. ★ is responsible for the photosynthesis process.
(Root system – Shoot system – Cytoplasm)

3 A) Write the scientific term:

1. A tool used for converting the electric energy to light energy. (.....)
2. Fires that occur as a result of the increase in the temperature of the electric machines. (.....)
3. It occurs to the Moon when it completely enters the shadow area of the Earth. (.....)
4. The fixed point of a rigid bar. (.....)
5. ★ The outer layer of the root of the plant. (.....)

B) The force arm length of a third class lever is 5 cm and the length of the arm of the resistance is 15 cm. If the resistance has a value of 300 Newton, calculate the value of the affecting force.

.....

.....

.....

.....

4 A) Correct the underlined words:

1. Second class levers always don't conserve effort. (.....)
2. Annular solar eclipse occurs in the shadow area of the Moon. (.....)
3. Although crowbar is a third class lever, it conserves effort. (.....)

B) Look at the opposite two figures (A & B), then answer in spaces below each one as required?

1. What is the way of connection in each circuit?
2. What happens when the light bulb number (2) in each circuit burns out?

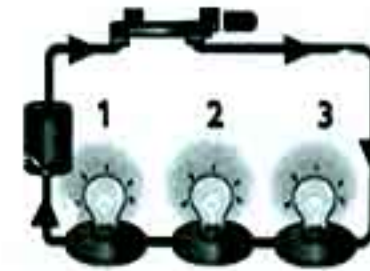


Figure (A)

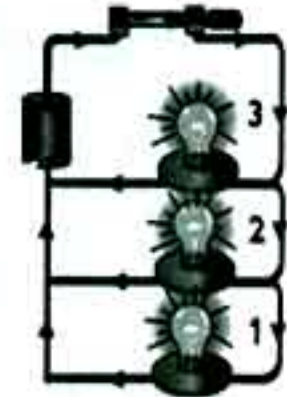


Figure (B)

Worksheets & Exams

6 Giza - Abo El-Nomrous Educational Zone - Ahmos Language School

1 A) Complete:

1. The light bulb consists of filament, and
2. From precaution in dealing with electricity and
3. The lunar eclipse occurs when the Sun, Earth and in one straight line and in the middle.
4. ★ The type of solar eclipse differs due to the movement of in front the Sun.
5. ★ Plants make their own food during process.

B) Classify the following machines according to the type of levers:

- | | |
|------------------|---------------|
| 1. Bottle opener | 2. Hockey bat |
| 3. Water opener | 4. Tweezers |
| 5. Wheelbarrow | 6. Nutcracker |

2 A) Write the scientific term:

1. A tool used to convert the electric energy into light energy. (.....)
2. Fires that occur as a result of the increase in the temperature of electric wires. (.....)
3. An astronomical phenomenon that occurs when the Earth, Sun and Moon are on one straight line and the Moon in middle. (.....)

B) Correct the underlined words:

1. Copper and iron are electric insulators. (.....)
2. To connect lamps in parallel, they are connected one after another. (.....)
3. In the first class levers the resistance force is between fulcrum and effort force. (.....)
4. ★ Umbra is a semi-dark area where the total solar eclipse occurs. (.....)
5. ★ Transpiration is losing of water in the shape of water droplets. (.....)

3 A) Choose the correct answer:

- When the whole Moon enters the shadow area (umbra) of Earth, occurs.
 - partial lunar eclipse
 - total lunar eclipse
 - total solar eclipse
 - partial solar eclipse
- Water can't be used to put out electric fires because it is
 - a good conductor of electricity
 - a bad conductor of electricity
 - not cold
 - may evaporate
- Which of the following gases is found in the fluorescent lamp but not in light bulb?
 - Neon
 - Argon
 - Mercury vapor
 - Water vapor
- ★ We can see a part of the Sun in the
 - umbra
 - penumbra
 - all the previous answers
 - no correct answers

B) Give a reason for:

- The second class lever always conserves effort.
.....
- We shouldn't look at the Sun directly with the naked eye during the solar eclipse.
.....
- ★ The cell membrane of root hairs has a selective permeability property.
.....

- 4 A) The length of the force arm of a third class lever is 5 cm and the length of the arm resistance is 15 cm if the resistance has value of 300 Newton, calculate the value of affecting force.

B) Choose from column A what suits it from column B:

(A)	(B)
1. From indirect injuries is	a) Thomas Alpha Edison.
2. Who invented the light bulb?	b) to avoid dangers.
3. From the importance of lever is	c) falling from top of a ladder.

C) ★ Compare between:

Osmosis property and selective permeability.

Worksheets & Exams

7 Giza - Boulak El-Dakroul Administration - Dar El-Hanan Language School

1 A) Complete the following question:

1. The filament of the light bulb is made of because it has high
2. The lead to destroying the tissue of the body.
3. occurs when a part of the Moon enters the Earth's umbra.
4. ★ Root hairs extend from the and are lined from inside with a thin layer of

B) Give a reason for:

1. We shouldn't look directly at the Sun with the naked eye during the solar eclipse.
.....
2. The glass bulb in the light bulb is filled with inert argon gas instead of air.
.....

2 A) Write the scientific term:

1. A rigid bar that rotates on a fixed point and is affected by a force and resistance. (.....)
2. The type of levers that do not save effort. (.....)
3. A way of connecting the lamp and machines in houses. (.....)
4. The solar eclipse in which the Sun disappears completely. (.....)

B) What's the importance of ...?

1. The first class lever.
.....
2. ★ Stomata.
.....

3 A) Problem:

The force of 50 N affected a lever of the second class whose force arm is 20 cm, calculate the resistance if the arm of the resistance equals 5 cm.

B) Correct the underlined words:

1. The electric lamp converts the electric energy into kinetic energy. (.....)
2. Wood is considered a good conductor of electricity. (.....)
3. The penumbra is the dark inner shadow area where the total solar eclipse occur. (.....)
4. ★ Plant absorbs nitrogen gas during the photosynthesis process. (.....)

4 A) Compare:

Point of comparison	2 nd class levers	3 rd class levers
Definition
Example

B) What happens when ...?

1. The electric lamp contains the atmospheric air.
.....
.....
.....
2. You insert a metallic bar in an electric socket.
.....
.....
.....

Worksheets & Exams

8 Alexandria - Al-Montazah Directorate - El-Rahman Language School

1 A) Write the scientific term:

1. A flow of electric charges that passes through a conducting material. (.....)
2. Levers in which effort force lies between the resistance force and the fulcrum. (.....)
3. An area that if the whole Moon is located in, there will be no eclipse. (.....)
4. It is a way in which the light bulbs are connected one after another in one route. (.....)
5. Distance between the effort force and the fulcrum. (.....)
6. Closed and continuous path through which electric current passes making a complete cycle. (.....)

B) Give a reason for:

1. Lamps are connected in parallel at home.

2. There is no annular lunar eclipse.

3. Crowbar is a first class lever.

2 A) What happens when ...?

1. Force arm equals resistance arm.
2. A part of the Moon enters shadow area of the Earth.
3. Filament of the light bulb is made of iron.

B) Problems:

- A lever has an effort force of 50 Newton, and the length of its force arm is 20 cm. If it is affected by a resistance force of 20 Newton, then:
 - a. Calculate the length of resistance arm.
 - b. Does this lever conserve effort or not? And why?

3 Complete the following sentences:

1. Glass tube of the fluorescent lamp is filled with and
2. The duration of solar eclipse is about, while duration of lunar eclipse is about
3. and are some of the dangers of direct electricity.
4. The lever is a bar that rotates around a fixed point called
5. The wheelbarrow is a class lever, while the paddle is a class lever.
6. There are two types of lamp bases: base and base.

4 A) Correct the underlined words:

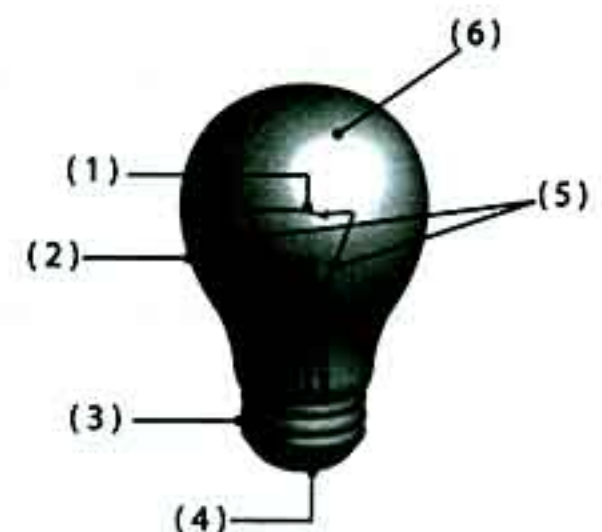
1. The human body is a good conductor of electricity as it contain gases. (.....)
2. Plugging more than one machine to one socket causes electric burn. (.....)
3. During the start of total lunar eclipse, the Moon tends to be yellow. (.....)
4. The third class lever always saves effort. (.....)
5. The simple electric circuit consists of a battery, a lamp and an insulator. (.....)
6. ★ The plant loses water in form of water vapor during the photosynthesis process. (.....)

B) What is meant by ...?

- The solar eclipse.
-
-

C) Label the following figure:

1.
2.
3.
4.
5.
6.



Worksheets & Exams

9 Alexandria - Al-Montazah Directorate

1 A) Complete the following question:

1. Tweezers are considered a class lever but the wheelbarrow is a class lever.
2. There are two ways for connecting lamps, connecting in and connecting in
3. The light bulb consists of the tungsten filament, and
4. The solar eclipse phenomenon occurs when the is located between the and the Sun on one straight line.
5. ★ Root hairs absorb water from the soil by the property of

- B) The exerted force of a balanced lever equals 50 Newton and the length of its arm is 2 cm and is affected by a resistance with a value of 20 Newton, calculate the length of the arm of its resistance.

(Write the law).

.....

.....

2 A) Correct the underlined words:

1. The hockey bat is used to decrease speed. (.....)
2. The phenomenon of lunar eclipse occurs in the starting of the lunar month. (.....)
3. The first scientist who described the lever is Newton. (.....)
4. The force is a fixed point that the bar rotates on. (.....)

B) Give a reason for:

1. The filament of the light bulb is made of tungsten.

.....

2. The first class levers sometimes conserve effort.

.....

3. ★ Each stoma is surrounded by two guard cells.

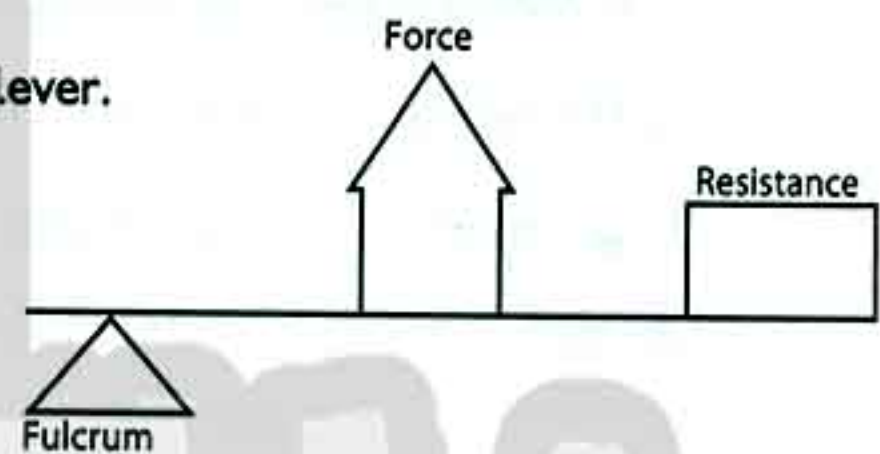
.....

3 A) Write the scientific term:

1. Means of converting the electric energy to light energy. (.....)
2. The lever used for moving the force and increasing distance. (.....)
3. The phenomena that occurs when the entire Moon falls in the shadow of the Earth. (.....)
4. One of the dangers of electricity that occurs as a result of the increase in the temperature of the electric machines. (.....)

B) Look at the opposite figure, then answer the following questions:

1. The opposite figure represents a class lever.
2. Does this lever conserve effort?
3. Give reasons for your answer.



4 A) Choose the correct answer:

1. The fluorescent lamp contains a little of (oxygen – nitrogen – mercury vapor)
2. The duration of the solar eclipse does not exceed
(seven minutes – an hour – 2 hours)
3. The resistance is between the force and the fulcrum in the class lever.
(first – second – third)
4. When we connect light bulb in an electric circuit in series with increasing the number of bulbs, lightening of the bulbs
(decreases – increases – remains constant)
5. ★ The cell membrane of the plant's root hair is characterized by
(photosynthesis – selective permeability – transpiration)

B) What happens if ...?

1. You insert a metal bar in an electric socket.
.....
2. Someone looks at the Sun directly with the naked eye for a long time, while observing the solar eclipse.
.....

Worksheets & Exams

10 Dakahlia - Dakahlia Educational Directorate

1 A) Write the scientific term:

1. One of the dangers of the electricity is that it destroys the tissue of the body. (.....)
2. It occurs when the Moon comes between the Earth and the Sun on one straight line. (.....)
3. It's the measuring unit of resistance and force of effort. (.....)
4. The materials that allow the flow of electricity through them. (.....)
5. A way of connecting the lamps and machines in houses. (.....)
6. The levers that sometimes conserve effort. (.....)
7. ★ The process by which plants lose the excess water. (.....)

B) A third class lever of 200 Newton force and its arm is 5 cm affects on a resistance of 100 Newton, calculate the length of the resistance arm that makes the lever balanced.

C) Mention two functions of the levers.

1.
2.

2 A) Choose the correct answer:

1. Lunar eclipse is formed in the of the lunar month.
a. beginning b. middle c. end d. after 5 days
2. The fluorescent lamp contains the inert gas.
a. hydrogen b. nitrogen c. argon d. helium
3. Which lever does not conserve effort? -
a. Wheelbarrow b. Nutcracker c. Manual broom d. Bottle opener
4. Electric results when your body is a part of an electric circuit.
a. fire b. shock c. burn d. insulator
5. Plugging many appliances to one socket may cause.
a. heating up of wires b. electric overload c. fires d. (a), (b), (c)
6. All the following materials allow the flow of the electric current except
a. iron b. aluminum c. rubber d. copper
7. ★ The last row of cortex layer is called
a. cortex b. endodermis c. xylem d. pith

B) Give a reason for:

1. We should not look directly at the Sun with the naked eye during the solar eclipse.
2. There are two points of connection at each tip of the fluorescent lamp.

3 A) Complete the following sentences:

1. During lunar eclipse, lies between and
2. The filament of the lamp is made of as it has point.
3. The electric current has only one path when the light bulbs are connected in
4. In the area of the shadow, the light source cannot be seen completely.
5. You cannot put out the electric fire with water because water is of electricity.

B) What happens when ...?

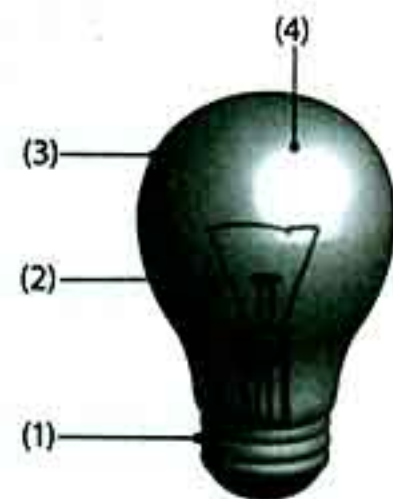
1. The whole Moon enters the semi-shaded area of the Earth.
2. One of the electric lamps burns out, while it is connected in parallel with the other.
3. ★ The absence of guard cells which surround the stomata in the plant's leaf.

4 A) Put (✓) or (X):

1. If the arm of force is shorter than the arm of resistance, then the lever conserves effort. ()
2. You must leave an electric machine connected with the electric current while taking a bath. ()
3. The Moon is colored in blue at the start of the total lunar eclipse. ()
4. Coal holder is used to avoid dangers. ()
5. The human body is a good conductor of electricity. ()
6. The electric lamp converts the light energy to electric energy. ()

B) Look at the figure, then write the labels:

1.
2.
3.
4.

**C) Write components of the simple electric circuit:**

1.
2.
3.
4.

Worksheets & Exams

11 Kafr El-Sheikh - Directorate of Education

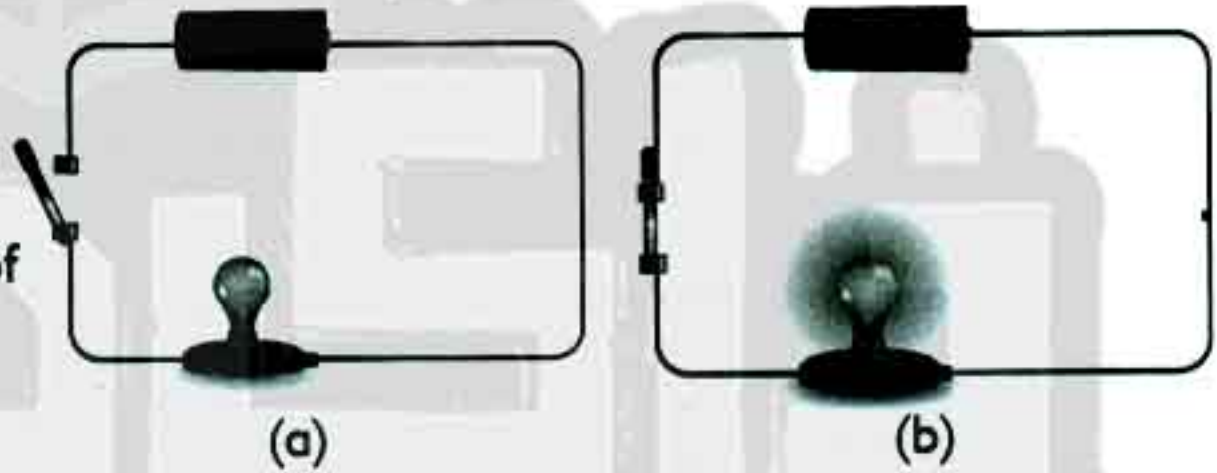
1 A) Choose the correct answer:

1. Duration of lunar eclipse extends for more than (6 – 4 – 2)..... hours.
2. The filament inside the electric lamp is made of (aluminum – tungsten – iron).....
3. The scissors are two levers of the (first – second – third)..... class lever.
4. Solar eclipse always occurs (during day – during night – at dawn).....
5. ★ Losing water from plant is called the process.
(photosynthesis – transpiration – osmosis)

B) The device which is drawn is well-known:

1. Give a name to this device.

2. What happens in case that any of the parts are not connected?



2 A) Choose from column (B) which suits in column (A):

(A)	(B)
1. Most electric machines produce	a) the partial lunar eclipse occurs.
2. Coal holder is a lever used to	b) heat.
3. Electric lamp is prevented from air to burn its filament by	c) avoid dangers.
4. When a part of the Moon enters the shadow area of the Earth,	d) the glass bulb.

B) Write the scientific term:

1. Materials that allow the flow of electricity through them. (.....)
2. Injuries caused by electricity which are not a direct cause. (.....)
3. ★ Small holes that are widely spread on the lower surface of the leaf. (.....)

3 A) Give a reason for:

1. Most electric lamps contain argon gas inside.
-
-

2. Second class levers always conserve the effort.
-
-

B) Correct the underlined words:

1. Connecting the electric lamps in the house must be in series. (.....)
2. Solar eclipse occurs when the Earth comes between the Moon and the Sun. (.....)
3. Light becomes bright when we connect more than one bulb in series. (.....)
4. Fluorescent lamp contains oxygen gas inside. (.....)
5. ★ Plant absorbs nitrogen gas during the photosynthesis process. (.....)

4 A) Put (✓) or (X):

1. Lunar eclipse causes harms to the eyes. ()
2. We must not play with electric connections. ()
3. Copper and iron are insulators to electricity. ()
4. Third class levers do not conserve the effort. ()

B) Complete the following:

1. Lunar eclipse can be seen from any place on the and when it starts the color of the Moon tends to be
2. ★ The cell membrane of the root hair has property which allows some salts to pass through.

Worksheets & Exams

12 Beheira - Science Supervision

1 A) Complete the following sentences:

1. The nutcracker is an example of the levers.
2. is a fixed point that a rigid bar rotates on.
3. In the case of connecting the lamps in the lighting of the lamps decreases with their increase in number.
4. eclipse is formed when part of the Moon enters umbra of the Earth.

B) Give a reason for:

1. We should not look at the Sun with the naked eye during the solar eclipse.

.....

.....

2. Some levers are important although they do not conserve effort.

.....

.....

2 A) Write the scientific term:

1. Distance between the fulcrum and the resistance. (.....)
2. Levers sometimes conserve the effort. (.....)
3. One of the dangers of the electricity is that it destroys the tissues of the body. (.....)
4. It occurs when the Moon lies between the Earth and the Sun in one straight line. (.....)

B) What happens when ...?

1. The force equals to the resistance in the first class lever.

.....

2. You insert a metallic bar in an electric socket.

.....

3 A) Choose the correct answer:

1. The fluorescent lamp contains gas. (oxygen – argon – chlorine)
2. The phenomenon of the lunar eclipse occurs in the of the lunar month. (first – middle – end)
3. The filament of the light bulb is made of (tungsten – copper – iron)
4. Seesaw is from class levers. (first – second – third)
5. ★ The plant gets mineral salts through (selective permeability – osmosis property – transpiration)

B) What is the importance of ...?

1. A glass bulb in the light bulb.
2. Second class lever.

4 A) Correct the underlined words:

1. The lunar eclipse occurs two times each month. (.....)
2. The electric lamp changes the electric energy into kinetic energy. (.....)
3. Rubber is from the materials that allow the flow of electricity through it. (.....)
4. Solar eclipse duration does not extend more than two hours and forty seconds. (.....)
5. ★ Plants carry out the photosynthesis process to get rid of excess water. (.....)

- B) The length of the force arm is 5 cm and the length of the resistance is 15 cm. If the resistance has a value of 300 Newton, calculate the value of the affecting force.
-
-

Worksheets & Exams

13 Beheira - Kafr El-Dawar Educational Zone - El-Safwa Private School

1 A) Complete the following question:

1. If the length of effort force arm is longer than the resistance arm, so the effort force is than the resistance force.
2. occurs as a result of passing electric current through the human body.
3. occurs when the whole Moon enters the Earth's umbra.
4. ★ The outer layer of root is called

B) Lever has fulcrum between resistance force and effort force if the effort force is 200 Newton and length of force arm is 2 cm.

Calculate the value of resistance force if the length of resistance arm is 4 cm. Does this lever conserve effort or not?

.....

2 A) Write the scientific term:

1. It is an astronomical phenomenon which occurs when the Sun, Earth and Moon are nearly on a straight line with the Moon in the middle. (.....)
2. The distance between fulcrum and resistance. (.....)
3. They are burns that result from electricity and cause the damage of body tissues. (.....)
4. It occurs when part of the Moon enters the Earth's umbra. (.....)
5. ★ The losing of water in the shape of water vapor from the plant leaves. (.....)

B) What happens when ...?

1. You touch a non-insulated wire that has an electric current.

2. Effort \times its arm does not equal to resistance \times its arm.

3 A) Choose the correct answer:

- We can observe the lunar eclipse when the Moon phase is the
 a. crescent
 b. 1st quadrature
 c. full Moon
 d. new Moon
- From levers which conserve effort is
 a. manual broom b. tweezers c. wheelbarrow d. coal holder
- The lunar eclipse occurs
 a. twice per year
 b. once every 21 years
 c. we cannot predict it
 d. once per month
- Levers were first described in 260 BC by the Greek scientist
 a. Thomas Edison
 b. Newton
 c. Archimedes
 d. Bohr

B) Compare between the first class lever and the third class lever:

P.O.C	First class lever	Third class lever
Definition
Example

4 A) Look at the figure in front of you, then answer:

- (1) points to
and its function.....
- (2) points to
and its is made of.....
- (3) points to
and its function.....



B) Give a reason for:

- Some levers are important for man although they do not conserve effort.

- Don't place furniture close to electrical machine that generates heat.

- We shouldn't look directly at the Sun with the naked eye during the solar eclipse.

Worksheets & Exams

14 Damietta - Directorate of Education - Official Language Schools

1 A) Complete the following sentences:

1. The fluorescent lamp contains gas and little of
2. When the arm of force equals the arm of resistance, the is equal to the
3. When a part of the Moon enters the Earth's umbra, phenomenon occurs, while phenomenon occurs when the cone shadow of the Moon does not reach the Earth's surface.
4. The filament of the bulb is made of and that is because it has a high

B) What happens when ...?

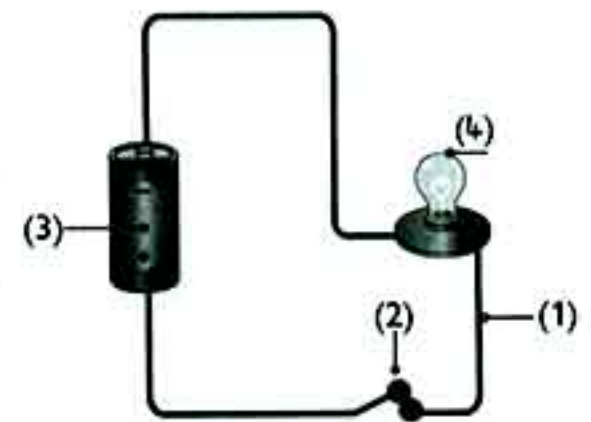
1. We put out the electric fires by water.
.....
2. The light bulbs in the house are connected in series.
.....

2 A) Write the scientific term:

1. One of the dangers of electricity causing damage to the tissues of the body. (.....)
2. Materials that allow the flow of electric current through them. (.....)
3. The solar eclipse in which the Sun disappears completely. (.....)
4. A method when electric lamps are connected one after another. (.....)

B) Look at the figure, then answer the following:

1. The figure represents
2. Write the labels:
 1.
 2.
 3.
 4.
3. The part no. (2) should be so that the light bulb glows.



Worksheets & Exams

15 Sharkia - Sharkia Educational Directorate

1 Write the scientific term:

1. The fixed point of a rigid bar on which the bar rotates. (.....)
2. Levers that have the force between the resistance and the fixed point. (.....)
3. The type of levers that always conserve effort. (.....)
4. Means of converting the electric energy to light energy. (.....)
5. Materials that allow the electric current to pass through them. (.....)
6. The phenomenon that occurs when the Earth comes between the Moon and the Sun on one straight line. (.....)
7. ★ They are tiny holes found on the surface of the leaf. (.....)

2 A) Choose the correct answer:

1. The force arm is sometimes equal to the resistance arm in the class levers.
(first – second – third)
2. The phenomenon of the lunar eclipse occurs in the of the lunar month.
(end – first – middle)
3. When we increase the number of the electric lamps in the series connection, their light intensity
(increases – decreases – remains the same)

B) Give a reason for:

1. The filament of the light bulb is made of tungsten.

.....

.....

2. Water cannot be used to put out the fire resulting from electricity.

.....

.....

3. We should not look directly at the Sun with the naked eye during the solar eclipse.

.....

.....

3 A) Complete the following:

1. Levers are very important as they increase speed , and
2. The simple electric circuit consists of , and electric switch.
3. and are examples of materials that are electric insulators.
4. Types of the lunar eclipse are and

B) The force affecting a second class lever equals 200 Newton and the length of its arm is 50 cm and a resistance with a value of 1000 Newton, calculate the value of the arm of the resistance:

1. Law of levers
2. Arm of the resistance =

4 Correct the underlined words:

1. The crowbar is an example of the third class levers. (.....)
2. The manual broom is an example of second class levers. (.....)
3. The glass bulb of the electric lamp contains hydrogen gas. (.....)
4. The electric lamps are connected in the house in series. (.....)
5. The electric fire occurs due to the passage of the electric current through the human body. (.....)
6. In the beginning of the total lunar eclipse, the color of the Moon tends to be black. (.....)
- 7 ★ Oxygen gas is produced during the respiration process in the plant. (.....)

Worksheets & Exams

16 Port Said - Directorate of Education - Inspectorate of Science

1 Complete the following:

1. The nutcracker is an example of the class lever.
2. Fluorescent lamp is filled with an inert gas.
3. In the solar eclipse, is found between the Sun and
4. All light bulbs are connected in in the house.
5. The manual broom is an example of the class levers.
6. ★ control the closing and opening of the stomata.

2 A) Choose the correct answer:

- The filament of the light bulb is made of
a. iron b. copper c. tungsten
- From the first class levers is
a. nutcracker b. sweet holder c. scissors
- From the examples of good electric conductors is
a. wood b. plastic c. copper
- Force arm is sometimes equal to resistance arm in class levers.
a. first b. second c. third

B) Match from column (A) with suitable in column (B):

(A)	(B)
1. First class levers	a) Levers that always conserve the effort.
2. Second class levers	b) Levers that do not conserve the effort.
3. Third class levers	c) Levers that sometimes conserve the effort.
4. The fulcrum	d) Fixed point that a rigid bar sits on.

3 A) Write the scientific term:

1. The phenomenon that occurs when a part of the Moon enters the shadow area of the Earth. (.....)
2. Fires occur as a result of the increase in the temperature of the electric machines. (.....)
3. The rigid bar that rotates on a fixed point and is affected by force and resistance. (.....)

B) Correct the underlined words:

1. Looking directly at the lunar eclipse is harmful to the eye. (.....)
2. While connecting the lamps in parallel, the lamps are connected one after another. (.....)
3. If the force arm is smaller than the resistance arm, the lever saves effort. (.....)

4 A) Give a reason for:

1. Water cannot be used to turn off the electric fires.
.....
2. ★ Root hairs can absorb water from the soil.
.....

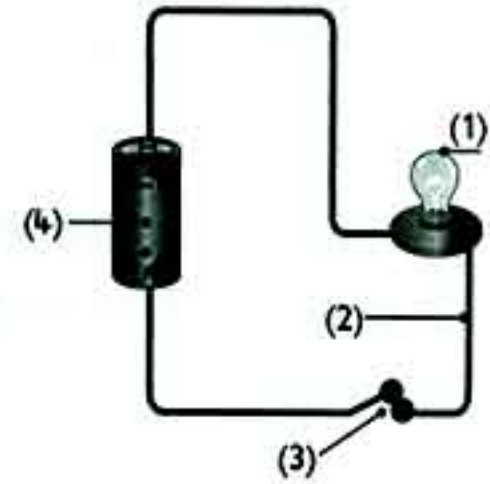
B) When would happen in each of the following cases?

When the whole Moon enters the shadow (umbra) area of the Earth.
.....

- C) The force affecting a second class lever equals 200 Newton and the length of its arm is 50 cm and has a resistance with a value 1000 Newton, calculate the value of the arm of the resistance.**
.....
.....
.....

D) Study the following figure, then complete:

1.
2.
3.
4.



Worksheets & Exams

17 South Sinai - Science Supervision

1 A) Complete the following sentences:

1. In the third class levers, the lies between and fulcrum.
2. From electric insulators and
3. From the components of the electric circuit are electric wires, switch and
4. Solar eclipse occurs when lies between the and the Sun on the same straight line.
5. The from electric dangers that causes the damage of the human body tissues.
6. Sweet holder is an example of levers.

B) Give a reason for:

1. We cannot use water in putting out electric fires.
.....
2. Some levers are important for man although they do not save effort.
.....
3. ★ The presence of stomata on the lower surface of the plant leaves.
.....

2 A) Choose the correct answer:

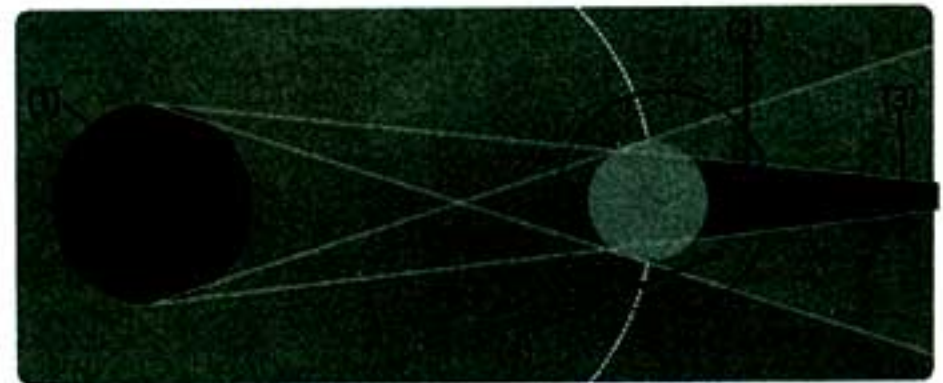
1. is/are from second class levers. (Scissors – Wheelbarrow – Manual broom)
2. When a lamp is connecting in parallel with several other lamps, the light intensity of the lamps (decreases – increases – remains as it is)
3. is from the electric conductors. (wood – rubber – iron)
4. is an example of first class levers. (crowbar – bottle opener – manual broom)
5. In electric lamp, the electric energy changes into energy. (kinetic – light – sound)
6. The time taken by the solar eclipse is the time taken by the lunar eclipse. (less than – more than – equal)

B) Mention some of the important precautions when dealing with electricity:

1.
2.
3.

C) The opposite figure represents the lunar eclipse phenomenon. Observe it, then label the figure:

1.
2.
3.
4.



3 A) Put (✓) or (X):

1. The light bulb contains mercury vapor. ()
2. Bottle opener is a third class lever. ()
3. Lunar eclipse does not require precautions or special devices to observe. ()
4. Scissors are from first class levers. ()
5. If the force arm is longer than the resistance arm, so the force is more than the resistance and the lever saves effort. ()
6. In the second class levers the force arm may be equal to the resistance arm. ()

B) Compare between:

Total lunar eclipse	Partial lunar eclipse

C) Join from column (A) with the suitable in column (B):

A	B
1. Fishing hook	a. connect the lamp to electric circuit.
2. Seesaw	b. source of the electric current.
3. Nutcracker	c. save effort some time.
4. Two pieces of lead in the base of the light bulb	d. always save effort.
	e. always do not save effort.

4 A) Write the scientific terms:

1. Levers at which the resistance lies between force and fulcrum. (.....)
2. A coiled thin wire made of tungsten in the light bulb. (.....)
3. A way in which the light bulbs are connected one after another, where the light intensity of the bulbs decreases by increasing their numbers. (.....)
4. The fixed point of a rigid bar on which the bar rotates. (.....)
5. One of the dangers of electricity that occurs as a result of passage of electric current through the human body. (.....)
6. Levers at which the fulcrum lies between the force and the resistance. (.....)

B) In a lever, if the length of the force arm = 4 cm, the length of the resistance force = 6 cm, and the value of the force = 48 N, calculate the value of the resistance.

C) What happens when ...?

1. The electric lamps in decorative lights are connected in series not parallel.
.....
2. The whole Moon enters the semi-shaded area of the Earth.
.....
3. The electric lamps contain the atmospheric air.
.....
4. You place the electric heater too close to furniture and rugs.
.....

Worksheets & Exams

18 Fayoum - Science Supervision

1 A) Complete the following:

- The fulcrum is between effort force and resistance in class lever.
 - first
 - second
 - third
 - first and second
- Fluorescent lamps contains gas.
 - neon
 - argon
 - oxygen
 - hydrogen
- Solar eclipse occurs when the between and
 - the Sun, the Earth, the Moon
 - the Moon, the Earth, the Sun
 - the Earth, the Sun, the Moon
 - the Sun, the Earth, Mars
- All kinds of class levers conserve effort.
 - first
 - second
 - third
 - first and second
- ★ The membrane of root hairs is
 - impermeable
 - permeable
 - semipermeable
 - no correct answers

B) A second class lever, its effort force is 100 Newton, its arm is 200 cm, this lever affects a resistance force that equals 500 Newton. Find the resistance arm:

Effort force \times = \times its arm

Resistance arm =

2 A) Write the scientific term:

- A way of connecting bulbs one after another. (.....)
- Type of lunar eclipse that occurs when the whole Moon enters the shadow area of the Earth (Umbra). (.....)
- One of the dangers of electricity which causes the damage of body tissues. (.....)
- A fixed point which a rigid bar rotates around it. (.....)

B) Give a reason for:

1. The bulb filament is made up of tungsten.

.....

2. You shouldn't observe the Sun directly.

.....

3. ★ Root hairs can absorb water from the soil.

.....

3 A) Put (✓) or (X):

- | | |
|---|-----|
| 1. The crowbar is a first class lever. | () |
| 2. In the electric bulb, the electric energy changes into kinetic energy. | () |
| 3. The lunar eclipse does not require precautions. | () |
| 4. In houses the electric lamps are connected in series. | () |

B) Classify the following tools (levers):**4 A) Complete the following question:**

- From examples of good conductors of electricity are and
- When a part of the Moon enters the shadow of a lunar eclipse takes place.
- The inner tube surface of the fluorescent lamp is covered with a substance and a little of vapor.
- ★ The outer layer of root is called

B) What happens when ...?

- The effort force is between resistance and fulcrum.
- Placing an electric heater near to furniture.
- Presence of air inside the electric bulb.

Worksheets & Exams

19 Assuit - Directorate of Education

1 A) Complete the following:

1. The type of levers where the arm of the force and the arm of resistance are equal is
2. In the solar eclipse, is found between the Sun and
3. Metallic materials are considered from the electric, while glass and rubber are considered from the electric
4. The manual broom is a class lever.

B) ★ Rearrange the layers of the root from inside to outside:

(Xylem - Pith - Epidermis - Cortex - Endodermis)

2 A) Put (✓) or (X):

1. The fulcrum in scissors lies between force and resistance. ()
2. The spiral base of the light bulb glows due to passing the electric current through it. ()
3. If the force arm is smaller than the resistance arm, the lever saves effort. ()
4. The lunar eclipse occurs in the end of the lunar month. ()
5. The human body is a good conductor of electricity. ()

B) What happens when ...?

1. Putting out the electric fires with water.

.....

.....

2. The light bulbs in the house are connected in series.

.....

.....

3 A) Write the scientific term:

1. A way used to connect electric lamps in branching routes. (.....)
2. It occurs when part of the Moon enters the shadow area of the Earth. (.....)
3. One of the dangers of the electricity is that it destroys the tissues of the body. (.....)
4. Type of levers that does not save effort. (.....)

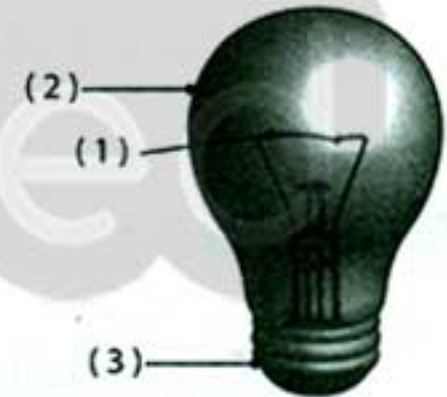
B) Give a reason for:

1. We should not look at the Sun with the naked eye.

2. Sometimes the first class lever saves effort.

4 A) Look at the figure, then answer

1. The device is
2. Label the figure:
 - (1)
 - (2)
 - (3)



- B) A force of 50 Newton affected a lever of the 2nd class, its force arm is 20 cm. Calculate the resistance given that the arm of the resistance = 5 cm.

Worksheets & Exams

20 Qena - Qena of Educational Administration

1 A) Complete the following question:

1. Materials that allow the of electricity through them are electric conductors.
2. Wheelbarrow and soda bottle opener are examples of the class lever.
3. When connecting light bulbs in series, the light intensity of the lamps by increasing their numbers.
4. Accuracy in performance and avoid dangers are from tasks of the class lever.
5. ★ The is widely spread on the lower surface of the leaves.

B) What is meant by ...?

1. The lever.

2. ★ Solar eclipse.

2 A) Choose the correct answer:

1. The duration of the lunar eclipse may last for more than
(two hours – two days – two months)
2. The fluorescent lamp contains the inert gas. (neon – argon – helium)
3. The types of the lunar eclipse are (total – partial – total and partial)
4. The filament of the light bulb is made of (copper – tungsten – iron)
5. ★ Water is transferred from the plant's stem to the leaves through
(endodermis – xylem vessels – stomata)

B) Give a reason for:

1. The electric heater must not be place close to textiles and carpets.

.....

.....

2. Sometimes the first class levers do not save effort.

.....

.....

3 Put (✓) or (X):

1. Water is used to put out electric fires. ()
2. Not leaving the wires naked is from the precautions of dealing with electricity. ()
3. All lamps and machines in the house are connected in parallel. ()
4. Falling from top of a ladder is considered from direct electric injuries. ()
5. Plastic, glass, rubber and wood are from the examples of the electric insulators. ()
6. In the third class levers, the resistance is between the effort force and the fulcrum. ()
7. ★ The endodermis layer regulates the passing of water to the xylem. ()

4 A) Write the scientific term:

1. It is one of the dangers of electricity that occurs due to passing the electric current through the human body. (.....)
2. It is a type of electric lamps that consists of a glass tube and two filaments of tungsten and two points of connection. (.....)

- B) A force of 30 Newton affects a lever and its force arm is 20 cm, the resistance is 20 Newton. Calculate the resistance arm.**

.....

.....

C) ★ Compare between the solar eclipse and the lunar eclipse.

.....

.....

Worksheets & Exams

21 Qena - Qena Directorate of Education

1 A) Write the scientific term:

1. It is the fixed point which the bar rotates around. (.....)
2. It is a way in which the light bulbs are connected one after another in one route. (.....)
3. One of the dangers of electricity that causes the damage of the tissues of the body. (.....)
4. It occurs when the whole Moon enters the shadow area of the Earth. (.....)

B) What happens when ...?

1. Electric fires are put out by water.
.....
2. Looking directly at the Sun.
.....

2 A) Complete the following:

1. The seesaw is class lever, while the wheelbarrow is class lever.
2. Electric lamps convert the energy into energy.
3. ★ The transmission of water from soil to the vacuole of the root hairs occurs by feature.

B) Choose the correct answer:

1. is considered from electric conductors.
a. Wood b. Iron c. Plastic
2. The filament of the light bulb is made of
a. argon b. tungsten c. copper
3. The color of the Moon tends to be during the start of the total lunar eclipse.
a. red b. green c. violet
4. Fulcrum is between effort force and resistance in class lever.
a. first b. second c. third

3 A) Put (✓) or (X):

1. The crowbar is a third class lever. ()
2. The effort force is measured by centimeter or meter. ()
3. The light bulbs are connected in parallel in the house. ()
4. The electric lamps contain the atmospheric air. ()
5. The lunar eclipse lasts for four minutes. ()
6. Solar eclipse occurs when the Moon is between the Sun and the Earth in one straight line. ()

B) Give a reason for:

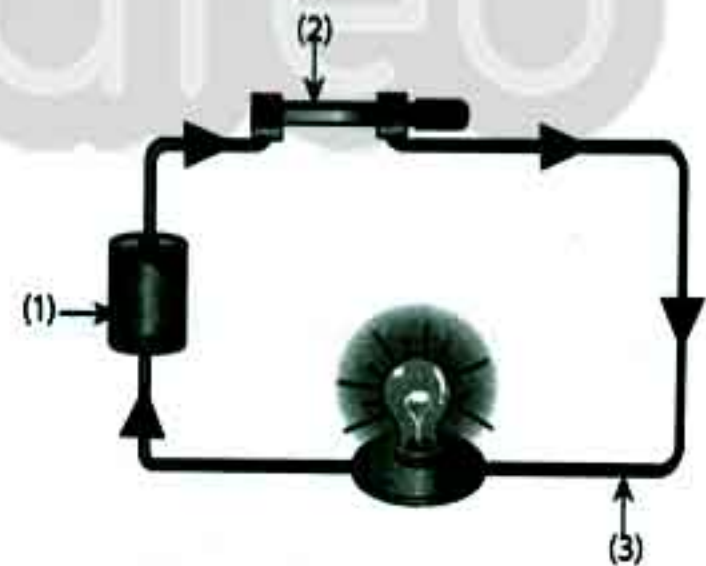
1. Second class levers save effort force.
.....
2. You shouldn't place a metallic object in the socket.
.....
3. ★The cell membrane of root hairs has a selective permeability property.
.....

- 4 A) In a lever, the effort force is 100 Newton, the length of the force arm = 25 cm and the resistance = 500 Newton. Calculate the resistance arm.
.....
.....
.....

B) The opposite figure represents

Write the labels:

1.
2.
3.



Worksheets & Exams

22 Sohag - Akhmeem Educational Management

1 Complete the following:

1. Levers help us to perform tasks more easily by and
2. The force and the resistance in levers are equal, if
3. The filament of the light bulb is made of because it has high
4. There are two ways to connect electric lamps: and
5. The eclipse occurs when the hides the sunlight from part of the Earth.
6. The lunar eclipse occurs in the of the lunar month.

2 Put (✓) or (X):

1. Wheelbarrow is an example of the first class lever. ()
2. The lever conserves effort if the effort force arm is shorter than the resistance arm. ()
3. The fluorescent lamp contains neon gas. ()
4. In series connection, if one lamp burns the other, lamps keep light. ()
5. The duration of the solar eclipse may last for more than two hours. ()
6. We use special glasses during observing the lunar eclipse. ()

3 A) Write the scientific term:

1. The fixed point of a rigid bar. (.....)
2. The type of levers that always conserve effort. (.....)
3. Tool that converts the electric energy to light energy. (.....)
4. The dangers of electricity that cause damage of the tissues of the body. (.....)
5. ★ The losing of water in the shape of water vapor from the plant leaves. (.....)

B) Compare between:

Comparison	Electric conductors	Electric insulators
Definition
Examples

- 4 A) The force affecting a lever equals 200 Newton and the length of its arm is 50 cm and a resistance with a value of 1000 Newton, calculate the value of the arm of resistance. (Mention the law of levers).

.....

B) What happens when ...?

1. There is air inside the light bulb.

.....

2. The electric fire is put out by water.

.....

3. The Earth comes between the Moon and the Sun and they are all on one straight line.

.....

4. ★ There is no osmosis feature in the plant.

.....

Worksheets & Exams

23 Sohag - Sohag Educational Zone

1 A) Complete the following:

1. The distance between the force and fulcrum is known as whereas the distance between the fulcrum and the resistance is called
2. The harms resulting from an electric shock depend on and
3. The fluorescent lamp consists of a glass tube that contains a little of and inner tube surface is covered with a material.
4. ★The is widely spread on the lower surface of the leaves.

B) Give a reason for:

1. The wheelbarrow is a lever that always conserves effort.

.....

.....

2. In houses, electric lamps are connected in parallel.

.....

.....

2 A) Write the scientific term:

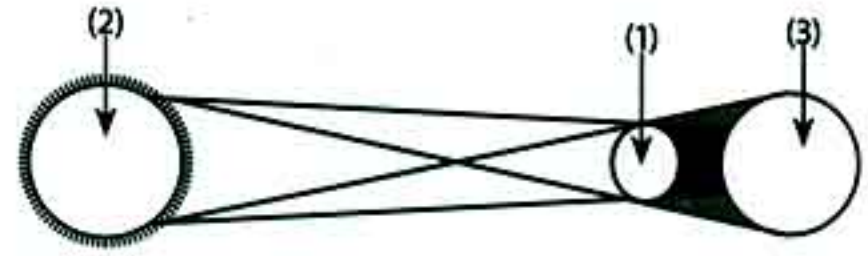
1. A rigid bar that rotates around the fulcrum and is affected by the force and the resistance. (.....)
2. Materials that allow the flow of electric current through them. (.....)
3. One of the dangers of electricity causing damage to the tissues of the body. (.....)
4. A tool used to convert the electric energy to light energy. (.....)
5. A type of levers that always does not save effort. (.....)

- B) The affecting force on a second class lever equals 200 Newton and the length of its arm is 50 cm. If the value of the resistance is 100 Newton, calculate the value of the arm of resistance.
-
-

3 A) The figure shows the solar eclipse:

Write the labels:

1.
2.
3.



B) Put (✓) or (X):

1. Rubber is from insulators of electricity. ()
2. The fluorescent lamp contains one filament of tungsten. ()
3. If the arm of force is longer than the arm of resistance then the lever conserves the effort. ()
4. Water is not used to put out electric fires. ()

4 A) What happen when ...?

1. The filament of the light bulb is made of iron.
.....
2. ★ There is no osmosis feature in the plant.
.....

B) Correct the underlined words:

1. The lunar eclipse extends for more than two days. (.....)
2. Looking at the lunar eclipse causes several harms to eye. (.....)
3. Electric fire occurs as a result of passing an electric current through the human body. (.....)

Worksheets & Exams

24 Luxor - Luxor Educational Zone

1 A) Choose the correct answer:

- The duration of the solar eclipse is
a. two hours b. 7 minutes and 40 seconds c. more that two hours
- The lunar eclipse occurs in the of the lunar month.
a. beginning b. middle c. end
- The filament of the light bulb is made of
a. copper b. iron c. tungsten
- is the lever that increases speed.
a. Hockey bat b. Nutcracker c. Manual broom
- ★ absorb water and mineral salts from the soil.
a. Leaves b. Root hairs c. Stems

B) What happens when ...?

- A part of your body touches two wires that have an electric current.
.....
- Looking directly at the solar eclipse.
.....

2 Complete the following:

- The electric lamp is a device that converts the energy into energy.
- and are ways that connect electricity.
- The crowbar is considered a class lever, but the is a third class levers.
- In the solar eclipse is found between the Sun and
- and are good conductors of electricity.
- The fluorescent lamps contain gas and little amount of

3 A) Write the scientific term:

- The distance between the resistance force and the fulcrum. (.....)
- A fixed point that a rigid bar rotates on. (.....)

3. They are burns that result from electricity and cause damage of the body tissues. (.....)

4. A type of eclipse that occurs when the Moon lies in a higher orbit from the Earth. (.....)

B) Give a reason for:

1. Wheelbarrow always conserves effort.

.....
.....

2. In total lunar eclipse the Moon tends to be red.

.....
.....

4 A) Correct the underlined words:

1. In parallel connection of electricity, the light intensity decreases by increasing the number of light bulbs. (.....)

2. When you place the electric heater close to a curtain, it causes electric shock. (.....)

3. When a part of the Moon enters the cone shadow partial solar eclipse occurs. (.....)

4. Base of light bulb glows and emits light when the electric current passes through it. (.....)

5. ★ Stomata are found in large numbers on the plant's stem. (.....)

B) In a second class lever, the effort force is 50 N and force arm = 20 cm.

If the value of the resistance arm = 5 cm, calculate the value of the resistance.

.....
.....
.....

Worksheets & Exams

25 Aswan - Aswan Educational Directorate

1 A) Complete the following:

- The crowbar is considered a class lever, but the manual broom is a class lever.
- The fluorescent lamp contains gas.
- You cannot put out the electric fires with water because water is
- There is a conservation of effort for the first class lever if is larger than
- ★ The in plant is surrounded by two guard cells.

B) Compare between:

- Electric conductors and electric insulators.

P.O.C	Electric conductors	Electric insulators
Definition
Examples

- Second class lever and third class lever.

P.O.C	Second class lever	Third class lever
Conservation of effort

2 A) Correct the underlined words:

- The electric lamp converts the electric energy to kinetic energy. (.....)
- While connecting the lamps in parallel, the lamps are connected one after another. (.....)
- ★ Transpiration is losing of water in the shape of water droplets. (.....)

B) Give a reason for:

- We shouldn't look directly at the Sun with the naked eye.

.....

- Not placing metal things inside the socket.

.....

- C) The force affecting a second class lever equals 200 Newton and the length of its arm is 50 cm and a resistance with a value of 1000 Newton, calculate the value of the arm of resistance.

3 A) Put (✓) or (X):

1. The two phenomena of solar and lunar eclipses are repeated regularly and can be predicted. ()
2. There are three connecting points at each of the fluorescent lamp ends. ()
3. Copper wires connect between the filament and the base of the light bulb. ()
4. Electric shock occurs due to the passage of the electric current through the human body. ()

B) What happens when ...?

1. You make the filament of the light bulb from iron.

.....

2. The light bulbs in the house are connected in series.

.....

4 A) Write the scientific terms:

1. It occurs to the Moon when it completely enters the shadow area of the Earth. (.....)
2. One of the dangers of the electricity is causing the damage of the tissues of the body. (.....)
3. The fixed point of a rigid bar on which the bar rotates. (.....)
4. Fires that occur due to the increase in the temperature of the electric wires. (.....)

B) Match from (A) to (B):

A	B
1. Tweezers	a. lever that increases the speed.
2. Hockey bat	b. lever that avoids danger.
3. Coal holder	c. lever that increases the distance.
4. Manual broom	d. lever that increases the accuracy in performance.

(1) (2) (3) (4)

Model Answers

First: The Main Book

Unit

Force and Motion

1

Types of levers

P. 17

Benchmark

- 1 1. resistance force, effort force
2. distance, speed
3. coal holder

- 2 1. c 2. a 3. b

- 3 1. fulcrum 2. lever 3. effort force

- 4 1. second 2. second

- 5 1. (✓) 2. (✓) 3. (X)

School
Book
Exercises

on Lesson

P. 19

- 1 1. fulcrum 2. lever
3. first class lever
4. third class lever
5. second class lever

- 2 1. increasing speed - increasing distance
increasing force
2. first - third 3. scissors - seesaw
4. wheelbarrow - nutcracker
5. ice holder - manual broom

- 3 a. first class lever.
b. third class lever.
c. third class lever.
d. second class lever.
e. second class lever.

- 4 a. crowbar - scissors - water pump.
b. the resistance force is between the fulcrum and the effort force.
c. wheelbarrow - bottle opener.
d. the effort force is between the fulcrum and the resistance force.
e. hockey bat - ice holder

GEM

Exercises on Lesson

P. 21

1

- | | | | |
|-------|-------|-------|-------|
| 1. b | 2. b | 3. a | 4. d |
| 5. d | 6. c | 7. b | 8. a |
| 9. a | 10. d | 11. a | 12. a |
| 13. c | 14. c | 15. c | 16. b |
| 17. b | 18. b | 19. c | 20. a |
| 21. c | 22. a | 23. c | 24. d |
| 25. a | 26. c | 27. a | |

- 2 1. levers 2. lever
3. fulcrum, resistance force and effort force
4. rigid bar 5. Archimedes
6. increasing force, increasing distance and increasing speed
7. hockey bat 8. small - objects
9. lever - effort force, resistance force
10. fulcrum - effort force and resistance
11. 1st class, 2nd class and 3rd class
12. distance - speed
13. effort force - fulcrum and resistance force
14. tweezers
15. resistance and effort force
16. first class lever
17. coal holder 18. 2nd class
19. 1st class lever - 3rd class lever
20. 1st class lever - 3rd class lever
21. effort force and fulcrum
22. 1st - fishing hook
23. 3rd

- 3 1. (✓) 2. (X) 3. (✓) 4. (X)
5. (X) 6. (X) 7. (X) 8. (✓)
9. (X) 10. (✓) 11. (X) 12. (X)
13. (✓) 14. (X) 15. (✓) 16. (✓)
17. (✓) 18. (X) 19. (X)

- 4 1. Archimedes 2. lever
3. fulcrum 4. nutcracker
5. manual broom
6. hockey bat 7. coal holder
8. resistance 9. effort force
10. 1st class levers
11. 1st class 12. second class lever
13. third class lever

- 5 1. Archimedes 2. first
3. fulcrum 4. second
5. avoiding danger 6. balance
7. second 8. increasing distance
9. 1st class 10. second
11. second 12. first
13. tweezers and fishing tool
14. third 15. second
16. hockey bat

Model Answers

- 6 1. 1. (b) 2. (f) 3. (a)
4. (e) 5. (d)
2. 1. (b) 2. (c) 3. (a) 4. (e)
5. (f) 6. (g) 7. (d)

- 7 1. Because it is a rigid bar that rotates around the fulcrum and is affected by effort force and resistance force.
2. As the fulcrum lies between the effort force and resistance force.
3. As the effort force lies between the fulcrum and resistance force.
4. Because levers help man to perform heavy tasks by means of:
1- increasing force.
2- increasing speed and distance.
3- avoiding danger.
4- accuracy in performance.
5. As the resistance lies between the effort force and the fulcrum.
6. As they are used to pick up very small objects.
7. Because we use small force to open nuts.
8. Because the lower part of the manual broom moves for a longer distance when the person moves its upper part for a smaller distance.
9. As the resistance lies between the effort force and the fulcrum.

- 8 1. **Fulcrum:** is a fixed point where a bar rotates.
2. **Lever:** is a rigid bar (straight or curved) that rotates around a fixed point called the fulcrum and is affected by an effort force and a resistance force.
3. **First class levers:** They are levers that have the fulcrum (O) between the effort force (F) and resistance force (R).
4. **Second class levers:** They are levers that have the resistance force (R) between the effort force (F) and the fulcrum (O).
5. **Third class levers:** They are levers that have the effort force (F) between the fulcrum (O) and the resistance force (R).

- 9 1. **Lever:** making the performance of tasks easier.
2. **Coal holder:** avoiding danger.
3. **Wheelbarrow:** moving force from one place to another.
4. **Crowbar:** increasing force.
5. **Manual broom:** increasing distance.
6. **Hockey bat:** increasing speed.

- 10 1. Nutcracker (1st class levers).
2. Pliers (2nd class levers).
3. Crowbar (3rd class levers).

- 11 1. They are used to avoid danger.
2. They are used in increasing speed.
3. They are used to move force from one place to another.
4. They increase distance.

- 12 1. coal holder 2. manual broom
3. tweezers 4. hockey bat
5. nutcracker - crowbar
6. nutcracker 7. manual broom

- 13 1. 3rd class lever 2. 1st class lever
3. 2nd class lever 4. 3rd class lever
5. 1st class lever 6. 2nd class lever

- 14 Answer by yourself.

15

1 st class lever	2 nd class lever	3 rd class lever
Fulcrum lies between effort force and resistance force. ex.: seesaw	Resistance force lies between fulcrum and effort force. ex.: nutcracker	Effort force lies between fulcrum and resistance force. ex.: manual broom

- 16 Man can't perform heavy tasks more easily.

TIMSS

Like Questions on Lesson

P. 31

- 1 a. lever b. increasing force
c. Answer by yourself.
d. first class lever, because the fulcrum is located between effort force and resistance force.

- 2 Answer by yourself.

2

Law of levers

P. 41

Benchmark

- 1 1. The resistance force \times its arm.
2. Second class levers.

- 2 1. b 2. a 3. b

- 3 1. arm force. 2. third class lever.

- 4 1. Because in the 2nd class levers, the effort force arm is always longer than the resistance arm.
2. Because in the first class levers only, the effort arm may be equal to the resistance arm.

Model Answers

- 5 1. The effort force is smaller than the resistance force and this lever conserves effort.
2. The lever doesn't conserve effort.

- 6 Effort force \times its arm = Resistance force \times its arm

$$500 \times 20 = 200 \times \text{its arm}$$

$$\text{resistance arm} = \frac{500 \times 20}{200} = 50 \text{ cm}$$

This lever doesn't save effort, because the effort force is greater than the resistance force.

School
Book
Exercises

on Lesson 2

P. 43

- 1 1. The effort force \times its arm = The resistance force \times its arm.
2. second - Third.
3. effort force arm - resistance arm.
4. resistance arm = effort force arm

- 2 1. Because the resistance force is larger than the effort force, so the effort arm is longer than the resistance arm.
2. Because the effort force is larger than the resistance force, so the effort arm is shorter than the resistance arm.
3. Because the effort arm is equal to the resistance arm in the first class levers.
4. Because they're used in:
• Increasing speed.
• Increasing distance.
• Avoid dangers.
• Accuracy in performance.

- 3 Figure (A): Because the effort force arm is longer than the resistance arm.

- 4 Force \times its arm = Resistance \times its arm

$$500 \times 20 = 200 \times \text{its arm}$$

$$\therefore \text{The resistance arm} = \frac{500 \times 20}{200} = 50 \text{ cm}$$

- 5 a. Don't conserve effort when the force arm is smaller than the resistance arm.
b. Conserve (Save) effort when the effort arm is longer than the resistance arm.
c. Don't conserve effort.

GEM
Exercises on Lesson 2

P. 45

- 1 1. d 2. c 3. b 4. a
5. a 6. a 7. d 8. b
9. c 10. c 11. b 12. a
13. a 14. b 15. b 16. b
17. c

- 2 1. Newton - m or (cm)
2. the resistance \times its arm
3. force arm - resistance arm
4. force and fulcrum
5. force arm and resistance arm
6. larger 7. larger
8. Newton 9. cm or meter
10. larger than
11. effort force - resistance force
12. 1 : 10 13. 25 Newton
14. arm of force - resistance
15. force - resistance 16. 1st class
17. effort
18. force - resistance
19. 2nd class - 3rd class
20. force arm - resistance arm
21. smaller - longer
22. force arm - resistance arm
23. force arm - resistance arm
24. 2 N
25. the arm of force is shorter than the arm of resistance
26. force arm - resistance arm
27. 16 cm

- 3 1. (✓) 2. (X) Newton
3. (✓) 4. (X) doesn't save
5. (✓) 6. (✓)
7. (✓) 8. (X) equal
9. (X) 20 cm 10. (✓)
11. (X) longer 12. (X) longer
13. (✓) 14. (X) less
15. (X) doesn't conserve
16. (X) less than
17. (✓) 18. (✓)
19. (X) doesn't save 20. (X) 1st class

- 4 1. arm of force 2. arm of resistance
3. law of levers 4. Newton
5. 2nd class levers
6. 3rd class levers 7. 1st class levers
8. tweezer 9. law of levers
10. 2nd class levers
11. 3rd class levers

- 5 1. smaller than 2. second
3. third 4. wheelbarrow
5. second 6. the arm of force
7. third 8. fulcrum
9. equal to 10. first
11. second 12. third
13. longer

- 6 1. c 2. a 3. b
4. e 5. d

Model Answers

- 7** 1. Because the arm of force is always longer than the arm of resistance. So effort force is always smaller than resistance force.
 2. Because the arm of force is longer than the arm of resistance force.
 3. When the arm of force is longer than the arm of resistance, the effort force is less than the resistance force.
 4. Because the arm of force is always longer than the arm of resistance.
 5. Because the arm of force is always longer than the arm of resistance. So effort force is always smaller than resistance force.
 6. Because they are used to:
 1- increase speed.
 2- increase distance.
 3- avoid danger.

- 8** 1. The effort force is less than the resistance force so it saves effort.
 2. The effort force is larger than the resistance force so it doesn't save effort.
 3. The force exerted = the resistance so the lever doesn't save effort.
 4. The resistance force becomes double the force effort.
 5. The lever doesn't save effort.

- 9** 1. The distance between the force and the fulcrum.
 2. The distance between the resistance and the fulcrum.
 3. arm of force \times force
 = arm of resistance \times resistance

- 10** a. effort force \times its arm = resistance \times its arm
 $X \times 5 = 1 \times 10$
 $X = \frac{10 \times 1}{5} = 2 \text{ Newton}$
 b. effort force \times its arm = resistance \times its arm
 $5 \times 8 = 2 \times Y$
 $Y = \frac{5 \times 8}{2} = 20 \text{ cm}$
 c. effort force \times its arm = resistance \times its arm
 $50 \times 10 = \text{resistance} \times 10$
 $\therefore \text{Resistance (Z)} = \frac{50 \times 10}{10} = 50 \text{ N}$
 d. effort force \times its arm = resistance \times its arm
 $100 \times \text{its arm} = 25 \times 8$
 $\therefore \text{Force arm (N)} = \frac{25 \times 8}{100} = 2 \text{ cm}$

11

P.O.C.	1 st class levers	2 nd class levers	3 rd class levers
1. Definition	are levers in which the fulcrum lies between effort force and resistance force	are levers in which resistance force lies between fulcrum and effort force	are levers in which effort force lies between the fulcrum and resistance force
2. Importance	sometimes save effort	always save effort	increase the speed - increase the distance - avoid dangers - are accurate in performance
3. Conservation of effort	sometimes save effort	always save effort	do not save effort
4. Examples	crowbar	bottle opener	fish hook

12 The force \times its arm = resistance \times its arm.

First class levers	Second class levers	Third class levers
the fulcrum lies between effort force and the force of resistance.	resistance lies between the fulcrum and effort force.	effort force lies between the fulcrum and resistance force.
sometimes conserve effort.	always conserve effort.	do not conserve effort.

13 1. Force \times its arm = resistance \times its arm

$$200 \times 50 = 100 \times \text{its arm}$$

$$\text{Arm of resistance} = \frac{200 \times 50}{100} = 100 \text{ cm}$$

$$2. \text{Force} \times \text{its arm} = \text{resistance} \times \text{its arm}$$

$$400 \times 10 = \text{resistance} \times 20$$

$$\text{Resistance (Ahmed's weight)} = \frac{10 \times 400}{20}$$

$$= 200 \text{ N}$$

$$3. \text{Force} \times \text{its arm} = \text{resistance} \times \text{its arm}$$

$$10 \times 20 = \text{resistance} \times 10$$

$$\text{Resistance} = 20 \text{ N}$$

Yes, because the length of force arm is longer than the length of resistance arm.

4. Rami's weight is heavier because when the force arm is longer than the resistance arm, the effort force is smaller than resistance force.

Model Answers

5. Force \times its arm = resistance \times its arm
 a. At 30 cm
 b. Force \times its arm = resistance \times its arm
 $1 \times 15 = \text{resistance} \times 5$
 $\therefore \text{resistance} = \frac{15 \times 1}{5} = 3 \text{ coins}$
 (No. of coins)
6. Force \times its arm = resistance \times its arm
 $400 \times \text{arm of force} = 200 \times 20$
 $\text{Arm of force} = \frac{4000}{400} = 10 \text{ cm}$
 No, because the arm of force is shorter than resistance arm.
7. Force \times its arm = resistance \times its arm
 $F \times 10 = 40 \times 4$
 $F = \frac{40 \times 4}{10} = 16 \text{ N}$
8. Force \times its arm = resistance \times its arm
 $100 \times \text{its arm} = 200 \times 20$
 $\text{Force arm} = \frac{200 \times 20}{100} = 40 \text{ cm}$
9. Force \times its arm = resistance \times its arm
 $200 \times 50 = 1000 \times \text{arm of resistance}$
 $\text{Arm of resistance} = 10 \text{ cm}$
10. Force \times its arm = resistance \times its arm
 $\text{Force} \times 5 = 300 \times 15$
 $\text{Force} = 900 \text{ N}$
11. Force \times its arm = resistance \times its arm
 $10 \times \text{its arm} = 20 \times 10$
 $\text{The force arm} = \frac{20 \times 10}{10} = 20 \text{ cm}$
12. 25 Newton.
13. Habiba's force \times distance =
 Mohamed's force \times distance
 $50 \times 200 = 60 \times 150$
 $10.000 \neq 9000$
 The seesaw is not balanced because effort force \times its arm \neq resistance force \times its arm.
14. & 15. Answer by yourself.

TIMSS Like Questions on Lesson 2

P. 56

- 1 a. water pump - boat paddle - crowbar
 b. water pump: increases distance that water moves.
 boat paddle: increases the speed.
 crowbar: increases force.
 c. wheelbarrow saves effort.
 d. Answer by yourself.
 e. force \times its arm = resistance \times its arm
 $20 \times 1.5 = \text{resistance} \times 0.25$
 $\therefore \text{resistance (weight)} = \frac{30}{0.25} = 120 \text{ N}$
 (Yes, it saves effort.)

- 2 a. effort = ??, effort force arm = 0.5 m
 resistance = 200 N, resistance arm = 3 m
 $\therefore \text{effort force} \times \text{arm force} =$
 $\text{resistance force} \times \text{resistance arm}$
 $\therefore \text{effort} \times 0.5 = 200 \times 3$
 $\therefore \text{effort} = \frac{600}{0.5} = 1200 \text{ N}$
 b. total effort = farmer's effort + the weight of stone.
 $\therefore \text{farmer's effort} = \text{total effort} - \text{weight of the stone}$
 $= 1200 - 750 = 450 \text{ N}$
 c. (Yes, it saves the farmer's effort.)

Unit 2 Electric Energy

1

Electric lamps

P. 67

Benchmark

- 1 1. tungsten, melting point.
 2. argon, mercury vapor
- 2 c
- 3 1. (X) 2. (X)
- 4 1. electric lamp. 2. filament.
- 5 1. Because it has a high melting point.
 2. To connect the fluorescent lamp to the electricity.
- 6 1. inner
 2. fluorescent lamp
 3. atmospheric air

School Book Exercises

on Lesson 1

P. 73

- 1 1. light bulbs - fluorescent lamps.
 2. tungsten - melting point.
 3. filament - glass bulb - base of the light bulb.
 4. argon.
- 2 1. Series connection.
 2. Electric lamp. 3. Parallel connection.
- 3 1. The iron will melt quickly and the filament will not glow.
 2. The filament will burn.
 3. By unscrewing one of the light bulbs, the others will turn off.

Model Answers

- 4 1. To connect the lamp with electricity.
2. To avoid turning off the rest of the lamps when one lamp is turned off or broken.
3. Because it has a high melting point that prevents the filament from melting at high temperature.

GEM

Exercises on Lesson 1

p. 74

- 1 1. b 2. a 3. d 4. c
5. c 6. c 7. c 8. b
9. c 10. c 11. c 12. c
13. b 14. a 15. b 16. c
17. c 18. d 19. b 20. c
21. d
- 2 1. electric lamps 2. Thomas Edison
3. artificial 4. series
5. parallel - series 6. air
7. tungsten - melting point
8. air - argon
9. base of the lamp - filament
10. spiral base-two-side nail base
11. glass tube - two tungsten filaments - two points of connection.
12. mercury vapor 13. phosphoric
14. argon gas 15. argon
16. battery - lamp - electric wire
17. series - parallel 18. parallel
19. decreases
20. series - increasing 21. series
- 3 1. (X) electric lamp 2. (X) argon
3. (X) artificial 4. (X) tungsten
5. (✓) 6. (X) doesn't
7. (X) argon 8. (✓)
9. (X) filament 10. (X) turn off
11. (X) argon 12. (✓)
13. (X) parallel 14. (✓)
15. (X) decrease 16. (X) doesn't change
17. (X) switch, electric wires
18. (✓) 19. (X) closed
20. (✓)
- 4 1. lamps
2. Thomas Edison
3. copper wire 4. argon
5. fluorescent lamp 6. argon
7. filament 8. neon
9. fluorescent lamp 10. light bulb
11. glass bulb
12. phosphoric material
13. base of light bulb 14. parallel connection

15. two-sided nail base 16. parallel connection
17. series connection 18. series
19. tungsten 20. electric circuit
21. battery
22. simple electric circuit

- 5 1. light 2. Thomas Edison
3. argon 4. inert
5. tungsten 6. two
7. two kinds 8. argon
9. decreases
10. fluorescent lamp 11. series
12. in parallel 13. parallel
14. remains as it is 15. parallel

- 6 1. As it doesn't burn the filament and increases the lifetime of the filament.
2. To prevent air from reaching the filament.
3. To protect filament from burning as argon gas doesn't burn and doesn't help in burning.
4. To connect the lamp with electricity in order to make the filament glow.
5. As they connect the fluorescent lamp to electricity.
6. When it heats, it glows and emits light when electric current passes through the filament.
7. To open and close the circuit.
8. To supply the circuit with electric current.
9. To avoid turning off the rest of the lamps when one lamp is turned off or damaged.
- 7 1. The filament will be burnt easily when air enters it.
2. The electricity will not reach the tungsten filament.
3. The filament will be easily burnt.
4. The filament will burn.
5. All the lamps will turn off.
6. The light intensity remains as it is.
7. The brightness of the other lamps will decrease.
8. The filament will melt.
9. The circuit will be opened and no electric current will pass through it.
10. Light intensity decreases and the lamps may all turn off.
11. The other lamps are not affected and remain turned on.

- 8 1. They are tools that convert electric energy into light energy.
2. It is a closed path through which electric current passes.
3. It is a way in which the light bulbs are connected in branching routes.
4. It is a way in which the bulbs are connected one after the other in one route.

Model Answers

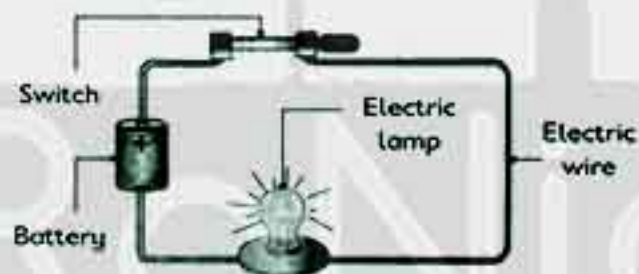
9 1.

P.O.C.	Series	Parallel
1. Light intensity	decreases by increasing the number of lamps	remains as it is
2. Removing one lamp from the connection	other lamps will turn off	other lamps will not be affected

2.

P.O.C.	Light bulb	Fluorescent lamp
1. Structure	1. Glass bulb 2. Tungsten filament 3. Base of light bulb	1. Glass tube 2. Two tungsten filaments 3. Two points of connection
2. The gas used	Argon gas	Argon gas and a little amount of mercury vapor.
3. Uses	In lighting houses, car lights and torches	1. Lighting houses, offices and underground metro. 2. Decorating commercial stores. 3. Decorating commercial advertisements.

10



- 11 1. Converts the electric energy into light energy.
2. Heats up and emits light.
3. Is used in decorating commercial shops, offices and houses.
4. Protects the filament from burning by preventing air from entering.
5. Carries light bulb in an upright position and connects light bulb with the electric circuit.
6. If one lamp is burnt, other lamps will not be affected, and by increasing the number of lamps, the intensity remains as it is.
7. 1. Protects the filament from burning.
2. Increases the lifetime of the filament.
8. Connects the fluorescent lamp to electricity.

- 12 a. Light bulb
b. 1- Glass bulb

- 2- Argon
3- Tungsten filament
4- Copper wire
5- Base of light bulb.

- 13 a. Simple electric circuit.
b. 1. Negative pole 3. Positive pole.
2. Battery 4. Lamp
5. Wire 6. Switch

- 14 1. (A) and (C). 2. (A) and (B).

- 15 1. c 2. b 3. e

- 16 1. Argon - mercury vapor.
2. 1. Glass tube.
2. Two points of connection.

TIMSS Like Questions on Lesson P. 83

- 1 1. a supply current and complete circuit.
2. A: three bulbs in series.
B: three bulbs in parallel.
3. A: they both go out
B: they both remain on
4. A: the bulbs become dimmer
B: the bulbs remain the same

- 2 Answer by yourself.

2 Dangers of electricity and how to deal with it

P. 91

Benchmark

- 1 1. electric shock - electric current.
2. good conductor - insulator.
- 2 1. b 2. c
- 3 1. (✓) 2. (✓)
- 4 1. Conducting electricity.
2. Bad conductors of electricity.
3. Electric fires.
- 5 Because water is a good conductor of electricity, so it increases fires and could harm the rescuers.

School
Book
Exercises

on Lesson 2

P. 99

1. 1. iron - copper.
2. wood - plastic - glass.
3. electric fires - electric shock - electric burns.
4. the damage of the body tissues.
5. a good conductor of electricity.
6. Placing an electric device that produces heat near flammable materials - plugging more than one machine in one socket - Not disconnecting the used machine after using it.
7. electric current.
8. electric current intensity - the time taken by the electric current passing through the body.
9. don't insert metal objects in the sockets.
- don't play with electric connection.
- don't use one socket for many devices at the same time.
10. touching fire or spark - touching an electric source directly.

2. 1. It may cause the electric shock.
2. It may cause the electric fires.
3. It may cause the electric burns.
4. It causes electric shock.
5. It will increase.

3. 1. electric shock. 2. electric fires.
3. electric burns.

4. 1. light houses 2. cook food
3. electric fires 4. electric shock
5. don't play with electric connection.
6. don't insert metal objects in electric sockets.

GEM

Exercises on Lesson

2

P. 100

1. 1. b 2. c 3. d 4. d
5. d 6. d 7. b 8. d
9. c 10. b 11. a 12. c
13. a 14. b 15. b 16. b

2. 1. refrigerators, iron and washing machines
2. conductors - insulators
3. electric current 4. good, bad
5. conductors - iron
6. iron - bad 7. insulators
8. electric burns - electric fires
9. closed
10. conductors - insulators
11. direct - indirect 12. electric fire
13. regular - sand 14. electric shock
15. electric burn 16. plastic

Model Answers

17. insulated

18. don't play with electric connection - don't use one socket for many devices

3. 1. (X) 2. (✓) 3. (X) 4. (✓)
5. (X) 6. (X) 7. (X) 8. (✓)
9. (✓) 10. (✓) 11. (X) 12. (X)
13. (X) 14. (X) 15. (✓) 16. (X)
17. (✓) 18. (✓) 19. (✓)

4. 1. conductors 2. insulators
3. direct injuries 4. electric burns
5. copper 6. electric fires
7. electric shocks
8. electric fire 9. electric shock
10. indirect injuries 11. electric shock

5. 1. iron 2. electric shock
3. carefully
4. electricity passes through the body
5. electric burns
6. increasing electric load
7. electric fire 8. sand
9. water 10. iron
11. covering electric wires
12. electric fires

6. 1. Because it doesn't allow the electric current to pass through.
2. Because water is a good conductor of electricity that increases the electric fire and harms the rescuers.
3. To avoid the electric fire.
4. Because copper is a good conductor of electricity.
5. Because rubber and glass are bad conductors of electricity.
6. To avoid the electric shock.
7. To avoid the electric fire.
8. To avoid the electric shock.
9. To avoid the electric shock.
10. To avoid the electric fire.
11. To avoid the electric shock.
12. Due to electric overload which heats up the wire and causes fire.
13. Because wood is an electric insulator.
14. To avoid the electric shock.

7. 1. Electric burn occurs as a result of electric shock.
2. It will cause the electric fire.
3. It will injure the one who tries to save the injured.
4. It will cause the electric shock.
5. It will turn off.
6. They can cause electric shocks when touched.

Model Answers

7. Different injuries either direct or indirect might happen.
8. The injured person can be saved as the wood is an insulator and the one who saves wouldn't be harmed.
9. The fire will increase as water is a good conductor of electricity.
10. It will cause the electric shock.

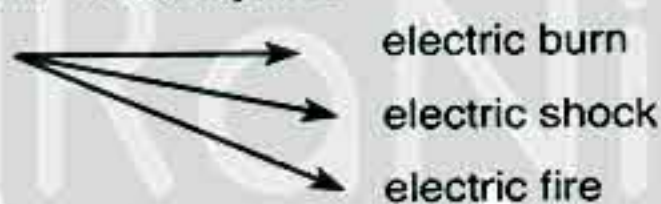
- 8
1. It causes the electric fire.
 2. They don't pass electricity.
 3. It harms the human body.
 4. It causes the electric fire.
 5. The fire will increase because water is a good conductor of electricity.
 6. It causes the damage of body tissues.
 7. It is a good conductor of electricity.
 8. It is a bad conductor (insulator) of electricity.

- 9
1. It might cause electric shock if touched.
 2. It might cause electric fire.
 3. It might cause electric fire due to overload.
 4. This might cause electric shock.
 5. This can cause electric fires.

- 10 Answer by yourself.

- 11
1. Do not plug several machines in one socket.
 2. Do not play with electric connections.
 3. Do not leave the wires uncovered and not insulated.

- 12 1. Direct injuries



2. Indirect injuries → falling down from the top of a ladder due to electric shock.

13

Electric conductors	Electric insulators
Materials that allow electric current to pass through. They close the electric circuit.	Materials that do not allow electric current to pass through. They open the electric circuit.

- 14 Answer by yourself.

- 15 It switches off automatically when any electric spark or fire happens.

- 16 a. electric shock b. electric burn
c. electric fire d. electric shock

- 17 Answer by yourself.

TIMSS Like Questions on Lesson 2

P. 108

- 1 a. Answer by yourself. b. parallel.

- 2 1. d 2. a 3. c 4. b 5. e

Unit 3 The Universe

1 The solar eclipse P. 120

Benchmark

- 1 1. Moon, Earth. 3. Moon - oval.

- 2 1. b 2. d 3. c 4. b

- 3 cone umbra: it's dark inner shadow in which solar eclipse occurs.

- 4 1. solar eclipse. 2. penumbra

- 5 1. Sun. 2. Moon - Earth.

School Book Exercises

on Lesson 1

P. 122

1

The types:	Partial Solar eclipse	Total Solar eclipse
The reasons for occurrence	The Moon blocks some of the Sunlight from Earth.	The Moon blocks all Sunlight from Earth

- 2 1. The sun. 2. penumbra.
3. The Moon. 4. Umbra.
5. The Earth.

- Due to the existence of the Earth, Moon and Sun on one straight line with the Moon being in the middle.

- 3 a. Because the Sun produces harmful rays as ultraviolet and infrared rays.
b. As the Moon appears smaller than the Sun and its cone shadow doesn't reach the Earth.

Model Answers

c. Due to the difference in the parts of the Sun that the Moon hides.

- 4** 1. The Moon blocks part of the sunlight from Earth.
2. The Moon appears smaller than the Sun at higher orbit away from Earth.
3. The Moon hides all sunlight from Earth.
4. Sun, Moon and Earth are nearly on one straight line with the Moon in the middle.

GEM

Exercises on Lesson 1
p. 123

- 1** 1. b 2. b 3. a 4. a
5. b 6. b 7. a 8. b
9. a 10. b 11. b 12. c
13. b 14. c 15. c 16. d
17. a

- 2** 1. Moon - oval 2. solar - moon
3. straight 4. Moon
5. total - partial
6. solar eclipse - Moon 7. umbra
8. penumbra - umbra
9. part - partial solar eclipse
10. annular 11. seven-forty
12. solar eclipse, Moon
13. looking - solar eclipse
14. special sunglasses
15. blindness 16. UV - IR

- 3** 1. (✓) 2. (✓)
3. (X) dark 4. (X) Moon
5. (X) Moon 6. (X) umbra
7. (✓) 8. (X) umbra
9. (X) penumbra 10. (X) doesn't reach
11. (✓)
12. (X) (seven minutes and few seconds)
13. (✓) 14. (X) harmful
15. (X) can't 16. (✓)
17. (X) special glasses

- 4** 1. solar eclipse 2. umbra
3. penumbra
4. cone shadow (umbra)
5. umbra
6. solar eclipse 7. penumbra
8. umbra 9. the Shadow area
10. total solar eclipse
11. total solar eclipse

12. total solar eclipse
13. partial solar eclipse
14. annular solar eclipse
15. UV - IR 16. eye retina

- 5** 1. straight 2. Moon
3. dark 4. Moon
5. annular 6. partial
7. 7 minutes 8. partial solar
9. partial 10. partial
11. annular 12. solar
13. harmful 14. special glasses

- 6** 1. Due to the existence of the Earth, Moon and Sun on one straight line with the Moon being in the middle.
2. Due to the difference in the part of the Sun that the Moon hides during the passage in front of the Sun.
3. Because the Moon rotates around the Earth in an oval shape orbit.
4. Because the Moon is a dark body that doesn't allow the sunlight to pass through.
5. Because the Moon hides all the sunlight from the Earth as the Moon's size appears equal to that of the Sun.
6. Because when the Moon rotates nearer to the Earth, its size appears equal to the Sun, so it hides all the sunlight.
7. Because the Moon's size appears smaller than that of the Sun, so the Sun appears as a lighted ring.
8. To avoid the harmful effect of (UV - IR) radiations.
9. To avoid the harmful effect of (UV - IR) radiations

- 7** 1. Solar eclipse occurs.
2. Affecting the retina of the eye and may cause blindness for few minutes.

(3, 4, 5) Answer by yourself

- 8** Answer by yourself.

- 9** 1.

Shadow	Semi-shadow
It is a dark inner shadow where no light reaches the Earth.	It is the faint outer shadow where only part of the light reaches the Earth.

2. Answer by yourself

- 10** Answer by yourself.

Model Answers

11 Answer by yourself.

12 1. Moon. 2. umbra 3. penumbra

13 & 14 Answer by yourself

TIMSS Like Questions on Lesson

P. 129

1 Answer by yourself.

2 1. c 2. e 3. d 4. f
5. g 6. b 7. a

2

The lunar eclipse

P. 135

Benchmark

1 1. Earth. 2. middle, full Moon.
3. Part-partial lunar eclipse.
4. lunar.

2 1. c 2. b 3. c

3 1. (X) 2. (✓)

4 1. total lunar eclipse
2. total lunar eclipse
3. lunar eclipse 4. red rays5 1. Total lunar eclipse occurs.
2. Lunar eclipse occurs.
3. Partial lunar eclipse occurs.

School Book Exercises

on Lesson 2

P. 137

1

P.O.C.	Solar eclipse	Lunar eclipse
Reasons	The Moon, the Sun & the Earth are on one straight line with the Moon in the middle.	The Moon, the Sun & the Earth are on one straight line with the Earth in the middle.
Precautions	Need special glasses.	doesn't need glasses.
Time of occurrence	during morning	during night

2 1. (✓) 2. (✓)

3 Answer by yourself.

4 Because the size of the Earth is bigger than the size of the Moon.

5 1. Part of Moon lies in the shadow area of the Earth (in umbra) and the other part lies in the semi-shadow area.
2. When the whole Moon falls in the shadow area of the Earth in (umbra).
3. The Sun, Earth & Moon are nearly in one straight line with the Earth in the middle.

GEM

Exercises on Lesson

P. 138

2

1 1. a 2. a 3. c 4. a
5. a 6. a 7. a 8. a
9. a 10. a 11. b 12. d
13. a 14. c 15. b 16. c2 1. Earth - Sun - Moon 2. middle - full Moon
3. two times 4. umbra
5. partial lunar 6. one or two hours
7. earth - red 8. lunar eclipse
9. 7 minutes and few seconds - more than 2 hours
10. lunar eclipse - earth 11. lunar - solar
12. total - partial 13. faint - eclipse
14. red - total 15. total lunar eclipse
16. lunar
17. solar eclipse - lunar eclipse
18. natural3 1. (✓) 2. (✓) 3. (X) 4. (✓)
5. (✓) 6. (X) 7. (X) 8. (X)
9. (✓) 10. (X) 11. (X) 12. (✓)
13. (X) 14. (✓) 15. (✓) 16. (✓)
17. (✓) 18. (X)4 1. partial lunar eclipse
2. total lunar eclipse 3. total lunar eclipse
4. lunar eclipse 5. lunar eclipse
6. lunar eclipse 7. infrared rays (IR).
8. lunar eclipse 9. penumbra
10. total lunar eclipse 11. lunar eclipse
12. penumbra 13. penumbra5 1. two hours 2. year 3. umbra
4. red 5. year
6. middle 7. lunar eclipse

Model Answers

8. Solar eclipse 9. month
10. the Earth lies between the Moon and the Sun
11. shorter than

- 6 1. Because the Moon lies in the umbra of the Earth.
2. Because part of the Moon lies in the umbra and the other part lies in the penumbra of the Earth.
3. Because it doesn't harm the eye and lasts for two hours.
4. Because lunar eclipse has no effect on the retina of eyes.
5. Because the size of Earth is bigger than the size of the Moon so it always blocks all the sunlight when it lies between the Sun and the Moon.
6. Because it blocks the light forming shadow cone.
7. Because both of them are caused by blocking of Sunlight and casting the middle body shadow on the other celestial body.
8. Because it depends on the movement of the Moon around the Earth and the movement of the Earth around the Sun, both occur regularly and the scientists can calculate the time of rotation of the Earth and the Moon around the Sun.
9. Because there are no harmful rays emitted through it.
10. Due to infrared rays which are not absorbed by the Earth's atmosphere.

- 7 1. Total lunar eclipse occurs.
2. Partial lunar eclipse occurs.
3. No eclipse occurs.
4. Lunar eclipse occurs.
5. No eclipse occurs.

8 Answer by yourself.

9 Answer by yourself.

10

Total lunar eclipse	Partial lunar eclipse
The whole Moon enters the umbra area of the Earth.	A part of the Moon enters the umbra of the Earth and the other part is in the penumbra.

- 11 1. partial lunar eclipse 2. partial lunar eclipse
3. non-lunar eclipse 4. total lunar eclipse

- 12 1. lunar eclipse.
2. (a) lunar no eclipse.
(b) total lunar eclipse.

13 Answer by yourself.

TIMSS

Like Questions on Lesson

2

P. 146

- 1 a. **Hassan:** The Moon seems red because it is the total lunar eclipse.
Shalmaa: It happens twice per year.
Alaa: The lunar eclipse doesn't need special glasses.
b. Eyad
c. Omar, because the lunar eclipse doesn't cause any harm to eyes.

2 Answer by yourself.

Unit 4 Structure and Function of Living Organisms

1 Absorption and transmission of water and mineral salts in plants

P. 155

Benchmark

- 1 1. sunlight - water - CO_2 - mineral salts.
2. epidermis, cytoplasm.
3. xylem - pith - cortex - epidermis.

2 epidermis - cortex - xylem - pith

3 1. The structure of root system.
2. root.

4 1. root hair 2. CO_2

5 Answer by yourself.

School
Book
Exercises

on Lesson

P. 161

- 1 1. c 2. b 3. b
- 2 1. osmosis feature 2. root hair
3. transpiration 4. xylem
5. guard cells
6. selective permeability
- 3 1. transpiration 2. root hair
3. transpiration 4. guard
- 4 1. (X) root hair
2. (X) transpiration
3. (X) stomata

Model Answers

5 1. Transpiration:

It's a vital process by which the plant loses water in the form of water vapor from leaves through holes called stomata or from other green parts.

2. Osmosis feature:

It's the transmission of water through a semi-permeable membrane from an area of high concentration of water to an area of low concentration of water.

3. Selective permeability:

It's the property of the cell membrane of the root hair enabling to control the passing of some salts in and out of the cell according to the plant needs.

GEM

Exercises on Lesson 1
p. 163

- | | | | |
|-------|-------|-------|-------|
| 1. b | 2. d | 3. d | 4. c |
| 5. a | 6. c | 7. d | 8. b |
| 9. b | 10. a | 11. b | 12. c |
| 13. b | 14. c | 15. b | 16. b |
| 17. a | 18. c | 19. b | |

- 2 1. photosynthesis.
2. CO₂ - photosynthesis
3. water - mineral salts
4. magnesium - phosphorus
5. CO₂ - O₂
6. stem - leaves - flowers
7. particles - fix
8. epidermis - pith
9. epidermis - cytoplasm
10. osmosis
11. selective permeability
12. xylem
13. salt - higher
14. osmosis - selective permeability
15. water - water vapor
16. selective permeability
17. selective permeability
18. stomata
19. stomata - transpiration
20. transpiration
21. lower
22. two guard cells
23. stomata
24. stomata - transpiration
25. two guard cells
26. stomata

- | | | | |
|----------|---------|---------|---------|
| 3 1. (✓) | 2. (X) | 3. (✓) | 4. (X) |
| 5. (X) | 6. (X) | 7. (✓) | 8. (X) |
| 9. (✓) | 10. (X) | 11. (✓) | 12. (X) |
| 13. (✓) | 14. (X) | 15. (X) | 16. (✓) |
| 17. (✓) | 18. (X) | 19. (✓) | |

- 4 1. photosynthesis process
2. root
3. selective permeability
4. osmosis
5. transpiration

- | | |
|-------------------|------------|
| 6. guard cells | 7. stomata |
| 8. osmosis | 9. stomata |
| 10. transpiration | |

- | | |
|--------------------|--------------------|
| 5 1. transpiration | 2. root |
| 3. transpiration | 4. CO ₂ |
| 5. CO ₂ | 6. stoma |
| 7. vacuole | 8. lower |
| 9. leaf | 10. vapor |

- 6 1. To increase the absorption rate of water and mineral salts - to fix the plant in soil.
2. In order to allow some types of salts to pass and prevent others according to the needs of the cell.
3. To allow for the transmission of water from soil to root by osmosis.
4. Because the salt concentration in the cell of the root vacuole is higher than that in the soil.
5. Due to osmosis process.
6. To transmit water inside the cell of the root hair cells by osmosis.
7. To control opening and closing of stoma.
8. To get rid of excess water in the form of water vapor by transpiration process.

- 7 1. Water flows from the root hair cells to the soil.
2. Drops of water will be formed on the inner side of the black bag.
3. Plant won't be able to make transpiration.
4. Water and minerals won't be able to rise up to the plant.
5. Salts will be transmitted from the soil to the root hairs by selective permeability property.
6. The stomata will remain open and transpiration will not be controlled.
7. Salts won't be transmitted to the cells of the root hair according to selective permeability feature.

- 8 1. Fixing the plant in the soil and absorbing water and mineral salts.
2. Controlling the passing of water to xylem.
3. Controlling the opening and closing of stoma.
4. The opening through which transpiration occurs.
5. Absorbed by the plant for making food.
6. Helping in raising water and mineral salts from root to xylem in root to stem to leaves.

9 Answer by yourself.

- 10 Pith → Xylem → Endodermis →
Cortex → Epidermis.

- | | |
|-----------------|--------------|
| 11 1. root hair | 2. epidermis |
| 3. endodermis | 4. xylem |
| 5. pith | |

Model Answers

- 12 a. 1. stomata. 2. guard cell.
b. a. open stomata.
b. closed stomata.

13 Answer by yourself.

TIMSS

 Like Questions on Lesson

P. 172

1 & 2 Answer by yourself.

Second: Worksheets & Exams

Unit 1 Force and Motion

1

Types of levers

P. 3

Worksheet 1

- 1 A) 1. lever 2. fulcrum
3. effort force
4. resistance force
B) 1. Because it is used to move heavy objects by using small effort force.
2. Because they help in performing tasks accurately (picking up very small objects).
- 2 A) 1. Archimedes 2. lever
3. coal holder, fishing hook
4. increasing speed, avoiding dangers
5. fulcrum, effort force and resistance force.
B) 1. (✓) 2. (X) 3. (X)
- 3 A) 1. avoiding dangers and preventing the contamination of ice
2. picking up small objects
3. moving the ball and increasing its speed
4. peeling the nut without too much effort
5. moving big objects with little effort force
6. transferring the force from the hand of the broom and increasing the distance while cleaning the floor
B) 1. manual broom
2. hockey bat 3. crowbar - nutcracker
4. coal holder
- 4 A) 1. effort
2. manual broom
3. increasing size.
B) Man can't perform heavy tasks more easily.

Worksheet 2

- 1 A) 1. second
2. picking up minute objects
3. Archimedes 4. crowbar
B) 1. Because the fulcrum (O) lies between effort force (F) and resistance (R).
2. Because the resistance force (R) lies between the effort force (F) and the fulcrum (O).
- 2 A) 1. fulcrum - resistance - force
2. first class lever
3. first - hockey bat 4. coal holder
B) Answer by yourself.
- 3 A) 1. crowbar 2. first
3. third 4. sometimes
B) a. 1st class b. 2nd class c. 3rd class d. 3rd class
- 4 A) 1. (✓) 2. (X) 3. (✓) 4. (X)
B) 1. levers where the fulcrum (O) lies between force (F) and the resistance (R).
2. levers where the resistance (R) lies between the force (F) and the fulcrum (O).
3. levers where the force (F) lies between resistance (R) and fulcrum (O).

2

Law of levers

P. 7

Worksheet 3

- 1 A) 1. resistance, its arm
2. longer 3. effort arm
4. resistance arm 5. Newton
B) 1. (✓) 2. (✓)
- 2 A) 1. second class levers
2. lever's law 3. tweezers
B) 1. The effort force is smaller than resistance force and the lever saves effort.
2. The effort force is bigger than the resistance force and the lever doesn't save effort.
- 3 A) 1. Because force arm is always longer than the resistance arm and thus the force exerted is less.
2. Because sometimes the force arm is longer than the resistance arm.
3. Because they help in other functions such as avoiding dangers, increasing speed, increasing distance and accuracy in performance.

Model Answers

B) Answer by yourself.

- 4 A) Effort force \times its arm = resistance force \times its arm
 $500 \times 20 = 200 \times \text{its arm}$
 Arm of resistance = $500 \times 20 / 200 = 50 \text{ cm}$
 B) Effort force \times its arm =
 resistance force \times its arm
 $5000 \times 20 = 10000 \times 5$
 $100000 \neq 50000$
 Then the lever is not balanced.

Worksheet 4

- 1 A) 1. 10 cm 2. force, resistance
 3. never save, always save
 B) 1. resistance arm
 2. lever 3. first class levers
- 2 A) Effort force \times its arm = resistance force \times its arm
 $100 \times 40 = 200 \times \text{its arm}$
 resistance arm = $100 \times 40 / 200 = 20 \text{ cm}$
 B) Answer by yourself.
- 3 A) Effort force \times its arm = resistance force \times its arm
 $F \times 3 = 30 \times 2$
 Force = $30 \times 2 / 3 = 20 \text{ Newton}$
 B) 1. It means that the force arm is longer than the resistance arm so the required force is less than the resistance.
 2. It means that the force arm is equal to or shorter than the resistance arm so the required effort is greater than or equal to the resistance.
 3. Because the arm of resistance is longer than the arm of force, so a bigger effort force is needed.
- 4 A) 1. Because in some of them the arm of force is longer than the arm of resistance, so effort force is less than the resistance (save effort); in other words the arm of force is shorter or equal to the resistance arm, so the effort force is greater than or equal to resistance (do not save effort).
 2. Because the wheelbarrow is a second class lever where the force arm is always longer than the resistance arm (saves effort).
 3. Because the arm of resistance is longer than the arm of force, so a bigger effort force is needed.
- B) 1. b. 2. a. 3. c.

School Book Exercises

on Unit

P. 11

- 1 a. 2 b. 3 c. 1
 d. 7 e. 4
- 2 1.(X) Second 2.(X) Third
 3.(X) first 4.(✓)
 5.(X) Larger than
- 3 1. Second 2. Third 3. First
 4. the resistance \times its arm
 5. First class lever.

4

P.O.C	First class levers	Second class levers	Third class levers
Definition	They are levers that have fulcrum in between effort force & resistance force.	They are levers that have resistance force in between effort & fulcrum.	They are levers that have effort force in between resistance & fulcrum.
Conservation of effort	sometimes conserve effort	always conserve effort	don't conserve effort
Examples	- crowbar - seesaw - pliers	- wheelbarrow - nutcracker - bottle opener	- holders - manual broom - tweezers

- 5 a. Third class lever b. First class lever
 c. Second class lever d. Third class lever
 e. First class lever
 f. Second class lever

- 6 Force \times its arm = resistance \times its arm
 $200 \times 50 = 100 \times \text{its arm}$
 $\therefore \text{Resistance arm} = \frac{200 \times 50}{100} = 100 \text{ cm}$

- 7 Force \times its arm = resistance \times its arm
 force $\times 5 = 300 \times 15$
 $\therefore \text{Affecting force} = \frac{300 \times 15}{5} = 900 \text{ Newton}$

GEM General Tests on Unit 1

Test 1 P. 13

- 1 A) 1. (X) 2. (✓) 3. (✓) 4. (✓)
5. (X) 6. (✓)
- B) 1. Because they help man to perform heavy tasks more easily by:
1- increasing force.
2- increasing speed.
3- increasing distance.
4- avoiding danger.
2. Because the force arm is shorter than the resistance arm.
- 2 A) 1. first class 2. first
3. effort force - fulcrum
B) 1. Effort force \times its arm = resistance force \times its arm
 $10 \times 10 = 20 \times \text{its arm}$
The arm of resistance = $\frac{10 \times 10}{20} = 5 \text{ cm}$
2. The lever saves effort because force arm is longer than resistance arm.
- 3 A) 1. The lever saves effort.
2. The lever doesn't save effort.
B) 1. second class lever.
2. tweezer. 3. first class lever.
- 4 A) 1. hockey bat 2. first
3. third 4. nutcracker
B) Effort force \times its arm = resistance force \times its arm
Force $\times 50 = 200 \times 15$
Force = $200 \times 15 / 50 = 60 \text{ Newton}$

Test 2

- 1 A) 1. first class lever 2. effort force
3. first class lever 4. resistance arm
B) 1. Because the force arm is always longer than the resistance arm so the effort force is less than the resistance force.
2. Because the force arm is smaller than the resistance arm so effort force is more than the resistance force.
C) Effort force \times its arm = resistance force \times its arm
Effort force $\times 5 = 200 \times 20$
Effort force = $\frac{200 \times 20}{5} = 800 \text{ N}$
- 2 A) 1. hockey bat 2. less
3. first 4. first class levers
B) 1. saves effort because the force arm is longer than the resistance arm.

Model Answers

2. saves effort because the force arm is longer than the resistance arm.
3. doesn't save effort because the resistance arm is longer than the force arm.

- 3 A) 1. c 2. b 3. d 4. b
B) 1. it is the rigid bar that rotates around a fixed point called fulcrum and is also affected by effort force and resistance force.
2. effort force \times its arm = resistance force \times its arm.

- 4 A) 1. (X) 2. (✓) 3. (X)
B) 1. The effort force is greater than the resistance force, so the lever has no mechanical benefit.
2. Many tasks can't be performed easily.

Unit 2 Electric Energy

1

Electric lamps

P. 17

Worksheet 5

- 1 A) 1. b 2. a 3. a 4. d
B) 1. Because it has a high melting point that prevents the melting of the filament at high temperature.
2. Because inert gases are inactive, so it protects the filament from burning and increases the lifetime of the filament.
3. Because they connect the fluorescent lamp to electricity.
- 2 A) 1. light bulb, fluorescent lamps
2. tungsten, melting point
3. Noble gas
4. base - filament 5. argon
6. Thomas Edison
B) 1. (✓) 2. (X) 3. (X) 4. (X)
- 3 A) A device used to change the electric energy in to light energy.
B) (a) light bulb
(b) 1. tungsten filament
2. argon gas
3. glass bulb 4. base of light bulb
5. piece of lead 6. copper wires

Model Answers

- 4 A) 1. The filament will melt.
2. The light bulb will burn.
B) 1. inert 2. two kinds
3. parallel 4. electric - light

Worksheet 6

- 1 A) 1. (X) 2. (✓) 3. (✓) 4. (✓)
B) 1. c 2. a 3. a

- 2 A) 1. b 2. c 3. a
B) 1. closed 2. parallel
3. series 4. argon

- 3 A) 1. fluorescent lamp.
2. parallel connection.
3. fluorescent lamp.
B) 1. To control in opening and closing electric circuit.
2. To save the energy consumed.
3. To avoid turning off all lamps when one lamp burns out.

- 4 A) 1. There will be no electric current.
2. The light intensity will decrease and when one lamp burns out, all lamps turn off.

P.O.C.	Connecting in series	Connecting in parallel
1. Light intensity	decreases by increasing the number of lamps	doesn't change by increasing the number of lamps
2- The effect of burning or unscrewing any of the lamps	all the lamps are turned off	the other lamps are not affected and are still turned on

2 Dangers of electricity and how to deal with it

P. 21

Worksheet 7

- 1 A) 1. conductor - insulators 3. electricity
2. direct - indirect 4. electric shock, electric fires, electric body burns.
B) **Conductors:** iron, copper, aluminum,
Insulators: wood, plastic, wool, rubber, glass.

- 2 A) 1. electric burns 2. insulators
3. conductors
B) 1. electric fires. 2. electric shock.

- 3 A) 1. c 2. c 3. b
B) 1. (X) 2. (X) 3. (X) 4. (X)

- 4 A) 1. you will get electric shock.
2. the electric circuit will open.
3. the harms and damage of the fire will increase.
B) 1. Because it is a good conductor of electricity.
2. Because they do not allow electric current to pass through.

Worksheet 8

- 1 A) 1. (X) 2. (✓) 3. (X) 4. (✓)
B) 1. Electric current intensity.
2. The time taken by the electric current passing through the body.

- 2 A) 1. Because iron is a good conductor of electricity and the electric current will flow and that will harm the injured person and the one who is trying to save him.
2. To avoid the dangers of electric shock when dealing with it.
3. Because copper is a good conductor of electricity.
B) 1. electric shock 2. increasing
3. electric

- 3 A) 1. electric burn 2. conductors
B) 1. Don't touch an electric machine with wet hands.
2. Don't play with electric connections.
3. Place a piece of plastic inside the socket.
C) 1. To put out the fire with sand instead of water because water will increase the fire because water is a good conductor of electricity.
2. Don't touch this person by hand but push him with a piece of wood.

- 4 A) 1. Electric shock.
2. Electric burns.
B) 1. Placing flammable materials beside machines which produce heat.
2. Not disconnecting the electric current from the electric machine which produces heat.
C) Answer by yourself.

School
Book
Exerciseson Unit 2
P. 25

- 1 1. Parallel - series.
2. Don't insert metal objects in electric sockets
- Don't play with electric connections.
3. Battery - electric lamp - conducting wires - switch.
4. wood - plastic - rubber.
5. Series.

- 2 1. light 2. Tungsten
3. series 4. Fluorescent lamps
5. The electric shock
6. Parallel 7. Parallel
8. argon 9. Iron

- 3 1. To protect the filament from burning.
2. To avoid electric shock.
3. To connect the lamp with electricity.
4. To avoid electric fires.

- 4 Answer by yourself.

- 5 1. electric conductors. 2. electric fires.
3. electric insulators.
4. Series connection. 5. electric lamps.
6. Parallel connection.
7. electric shock. 8. electric burns.

- 6 Answer by yourself.

GEM

General Tests on Unit 2

P. 27

Test 1

- 1 A) 1. series, parallel
2. copper, aluminum
3. parallel - series.
4. light bulb, fluorescent lamps.

B)	Natural sources of light	Artificial sources of light
	Sun - stars	Lamp - candles

- 2 A) 1. light 2. tungsten
3. series 4. fluorescent
5. electric shock 6. parallel
7. argon 8. copper

Model Answers

- B) 1. battery 2. positive pole
3. negative pole 4. switch
5. wire 6. lamp
• control opening and closing a circuit.

- 3 A) 1. good conductors of electricity
2. electric fires 3. electric insulators
4. connecting in series
5. connecting in parallel
6. electric lamp 7. electric shock
8. electric burns
B) in parallel to avoid turning off all lamps when one lamp burns out.

- 4 A) 1. To extend the lifetime of the filament.
2. To protect ourselves from electricity dangers.
3. To conduct the electricity to the two filaments of the electric lamp.
4. To prevent the cause of electric fire.
B) 1. (X) 2. (X)
3. (X) 4. (✓)
5. (✓) 6. (✓)

Test 2

- 1 A) 1. series 2. carefully
3. wood 4. good
B) 1. to prevent electricity from flowing through the human body causing electric shock.
2. Because the battery is the source of electricity in the electric circuit.

- 2 A) 1. (X) 2. (X) 3. (✓) 4. (X)
B) Answer by yourself.

- 3 A) 1. The lamp will not glow.
2. When one of the lamps is damaged or turned off, all the other lamps in the house will turn off.
3. The electric current will not flow and it won't light.
B) 1. to prevent air from reaching the filament.
2. Because it is the source of electricity in the electric circuit.

- 4 A) 1. wood, plastic.
2. battery, electric lamp, conducting wires.
3. plug several devices in one socket.
4. electric burns.
B) 1. Conducting the electric current to the filament.
2. emits light and heat glows when electric current passes through it.
3. to control opening and closing the circuit.

Model Answers

Halfway Exams

P. 31

Exam 1

- 1 A) 1. c 2. b 3. c
 4. c 5. c 6. a
- B) 1. Substances that don't allow electric current to flow.
 2. A rigid bar that rotates around a fixed point called the fulcrum and is affected by the force and the resistance.
 3. Fires that result from electric overload or electric short circuit or any form of electric misuse.
 4. A simple closed path through which electric current flows. It consists of battery (source of electricity), electric wires, electric switch and a lamp.

- 2 A) 1. Because it has many functions that make our lives easier, such as increasing force, increasing speed, transferring force and avoiding danger.
 2. Because it has a high melting point and it glows when the electric current passes.
 3. To avoid turning off all the lamps when one lamp burns out.
 4. Because water is a good conductor of electricity and it increases the intensity of the fire.
 5. Because wood is a bad conductor of electricity and it will isolate the injured person from the electric circuit.
- B) Answer by yourself.

- 3 A) 1. **In series:** lamps are connected in one route.
In parallel: lamps are connected in branching routes.
 2. **1st class levers:** the fulcrum lies between the force and resistance.
3rd class levers: the force lies between the fulcrum and the resistance.
 3. **Good conductors:** allow electric current to pass through.
Insulators: do not allow the electric current to pass through.
- B) Answer by yourself.

- 4 A) 1. (X) 2. (X) 3. (✓)
 4. (X) 5. (X) 6. (X)
- B) Force effort x its arm = resistance x its arm
 $8 \times 2 = 4 \times \text{its arm}$
 $\therefore \text{Resistance arm} = \frac{8 \times 2}{4} = 4 \text{ cm}$

Exam 2

- 1 A) 1. second - first 2. mercury vapor.
 3. electric.
 4. Thomas Eidson - Tungsten.
 5. electric burn.

- B) 1. The lever doesn't conserve effort.
 2. The light intensity remains as it is.

- 2 A) 1. (X) 2. (X) 3. (✓)
 4. (✓) 5. (X)

- B) Force x its arm = resistance x its arm
 $30 \times 20 = 20 \times \text{resistance arm}$
 $\text{Resistance arm} = \frac{30 \times 20}{20} = 30 \text{ cm}$

- 3 A) 1. tungsten 2. wheelbarrow
 3. rubber 4. scissors 5. decrease
- B) • It carries the light bulb in an upright position.
 • It connects the light bulb to the electric circuit.
 • The type of base: spiral base and two-sided nail.

- 4 A) 1. good conductor of electricity
 2. force arm 3. electric burn
 4. electric lamp 5. fulcrum
- B) 1. To avoid electric fire.
 2. Because it has a high melting point.

Exam 3

- 1 A) 1. mercury vapor
 2. wood 3. scissors
 4. nutcracker 5. plastic
- B) Force x its arm = resistance x its arm
 $50 \times 20 = \text{resistance} \times 5$
 $\text{Resistance force} = \frac{50 \times 20}{5} = 200 \text{ N}$

- 2 A) 1. wire - battery 2. second
 3. Argon - mercury vapor
 4. hockey bat 5. tungsten - melting point
- B) - electric circuit
 1. lamp 2. electric wire
 3. battery

- 3 A) 1. bad conductor of electricity
 2. series connection
 3. electric burn 4. lever
 5. electric lamp
- B) 1. cause electric fire
 2. The lever conserves the effort.

Model Answers

- 4 A) 1. second 2. water
3. parallel connection
4. second
5. inactive (inert)
B) 1. Because it is a good conductor of electricity.
2. Because the force arm is always longer than the resistance arm.

Unit 3 The Universe

1

The solar eclipse

P. 37

Worksheet 9

- 1 A) 1. the Moon, the Earth, straight
2. shadow
3. Moon - elliptical (oval)
4. ultraviolet - infrared
B) 1. It is the dark inner shadow in which the total solar eclipse appears.
2. It is the faint outer shadow in which the partial solar eclipse appears.

- 2 A) 1. c 2. b 3. a
B) 1. The formation of a shadow area.
2. The solar eclipse occurs.

- 3 A) 1. the solar eclipse
2. penumbra (semi-shadow)
3. umbra (shadow)
B) Answer by yourself.

- 4 A) 1. tennis ball (moon)
2. penumbra 3. umbra
4. screen (earth)
B) 1. Because Earth, Moon and Sun are on one straight line with the Moon in the middle.
2. Because the Moon rotates around the Earth in an elliptical orbit.

Worksheet 10

- 1 A) 1. (✓) 2. (X) 3. (✓) 4. (X)
5. (X)
B) Answer by yourself.

- 2 A) 1. b 2. c 3. b

- B) 1. To avoid ultraviolet and infrared rays which affect the retina of eye and may cause blindness.
2. Due to the difference in the part of the Sun that the Moon hides during its passage in front of the Sun.
3. Because the Moon hides all the sunlight from the Earth.

- 3 A) 1. total solar eclipse 2. annular
3. sunglasses

- B) 1. The harmful rays that emit from the Sun affect the human eye.
2. A dark body blocks the path of the light rays causing a dark area (shadow).

- 4 A) Answer by yourself.
B) 1. Ultraviolet and infrared.
2. The retina.

2

The lunar eclipse

P. 41

Worksheet 11

- 1 A) 1. Because the Moon lies in the shadow area of the Earth.
2. Due to red rays which are not absorbed by the Earth's atmosphere.
3. Because it doesn't cause any harm to the eye.
B) 1. the lunar eclipse.
2. middle - full Moon.
3. total - partial.
4. shadow

- 2 A) 1. an incomplete disk 2. total
3. middle
B) 1. an hour or two
2. partially

- 3 A) Answer by yourself.
B) 1. The lunar eclipse occurs.
2. A faint Moon with no eclipse.

- 4 A) 1. It is an astronomical phenomenon which occurs when the Sun, the Earth, and the Moon are nearly on one straight line and the Earth is in the middle hiding sunlight from the Moon.

Model Answers

2. It is the lunar eclipse which occurs when the whole Moon enters the shadow area (umbra) of the Earth.
3. It is the lunar eclipse which occurs when a part of the Moon enters the shadow area (umbra) of the Earth.

B) Answer by yourself.

Worksheet 12

- 1 A) 1. lunar eclipse - Earth

2. total lunar

3. lunar - solar

B) 1. total lunar eclipse.

2. The partial lunar eclipse

3. The lunar eclipse

- 2 A) 1. c 2. a 3. a

B) 1. (✓) 2. (✓) 3. (X)

- 3 A) 1. 3 times 2. larger

3. lunar eclipse

B) Answer by yourself.

- 4 A) 1. The partial lunar eclipse occurs.

2. The total lunar eclipse takes place.

B) 1. The total lunar eclipse.

2. 1. The orbit of the Moon around the Earth.

2. Earth. 3. penumbra 4. umbra

School Book Exercises

on Unit 3

P. 45

- 1 1. Because the Sun emits harmful rays as ultraviolet ray and infrared ray.
2. Due to the difference in the parts of the Sun that the Moon hides.
3. Because the size of the Earth is bigger than the size of the Moon.
4. Because the Moon blocks the sunlight totally from the Earth.

- 2 1. solar eclipse - Moon.

2. lunar eclipse - Earth.

3. annular.

- 3 1. (✓) 2. (✓) 3. (✓)

- 4 1. Cone umbra:

It's the dark inner shadow in which the total solar eclipse appears.

2. The Penumbra:

It's the faint outer shadow in which the partial solar eclipse appears.

3. Total solar eclipse:

It's the type of the solar eclipse at which the Moon hides all the sunlight from reaching to the earth, it appears in umber area.

4. Partial solar eclipse:

It's the type of the solar eclipse at which the Moon hides a part of Sunlight from earth, it appears in penumbra area.

5. Total lunar eclips:

It's the lunar eclipse which happens when the whole Moon falls in the shadow area of the Earth (umbra).

- 5 Answer by yourself.

- 6 1. The total lunar eclipse.

2. Partial lunar eclipse.

3. Lunar eclipse.

GEM General Tests on Unit 3

P. 47

Test 1

- 1 A) 1. the solar eclipse, Moon

2. the lunar eclipse, Earth

3. smaller oval

4. total - partial

5. annular

B)

Total lunar eclipse

The whole Moon enters the umbra of the Earth.

Partial lunar eclipse

Part of the Moon enters the umbra of the Earth.

- 2 A) 1. (X) 2. (X) 3. (✓) 4. (✓)

B) The partial lunar eclipse occurs.

- 3 A) 1. Because the size of the Earth is bigger than the Moon so it always blocks all the sunlight.

2. Because the Sun emits harmful rays during the eclipse that cause blindness.

3. Because it doesn't harm man.

B) Answer by yourself.

- 4 A) 1. The lunar eclipse

2. a. the partial lunar eclipse

b. the total lunar eclipse

B) Answer by yourself.

Model Answers

Test 2

- 1 A) 1. a 2. a 3. b 4. a
 B) 1. Because it doesn't harm the eye and lasts for two hours.
 2. The Moon falls between the Earth and the Sun on the same straight line.
 3. Answer by yourself

- 2 A) 1. penumbra 2. the lunar eclipse
 3. the total lunar eclipse
 4. the solar eclipse
 B) Because the size of the Earth is bigger than the Moon.

- 3 A) 1. the lunar month
 2. Natural
 3. sight
 4. total - partial
 B) 1. The Earth falls between the Sun and the Moon on the same straight line.
 2. The Moon falls between the Earth and the Sun on the same straight line.

- 4 A) 1. (✓) 2. (X) 3. (✓) 4. (X)
 5. (X)
 B) The solar eclipse because the Moon, the Earth and the Sun are on one straight line and the Moon is in the middle.

Unit 4 Structure and Function of Living Organisms

1 Absorption and transmission of water and mineral salts in plants

P.51

Worksheet 13

- 1 A) 1. carbon dioxide / oxygen
 2. epidermis
 3. root system - shoot system
 4. cortex layer - endodermis

- B) 1. (X) 2. (X)

- 2 A) 1. transpiration 2. oxygen gas
 3. osmosis 4. root hair
 B) Answer by yourself.

- 3 A) 1. To fix the plant in soil and cover a large area in soil to increase the absorption process of water and mineral salts.
 2. Because plants cannot carry out photosynthesis process in the absence of light.
 3. To allow the transmission of water from soil to root by osmosis process.

- B) 1. root hair 2. epidermis
 3. cortex 4. xylem
 5. pith

- 4 A) 1. It is the property of cell membrane of the root hair that allows some types of salts to pass in and out of the cell according to the needs of the plant.
 2. It is the transmission of water molecules through semi-permeable membranes from regions of high concentration of water to regions of low concentration of water.
 B) 1. a. fixes the plant in soil.
 b. Absorbs water and mineral salts from soil.
 2. To regulate opening and closing the stomata during transpiration.

Worksheet 14

- 1 A) 1. lower.
 2. water, osmosis - high - low.
 3. epidermis - pith.
 4. water vapor, stomata, transpiration.
 B) 1. Allowing water to pass from root to stem and leaves.
 2. Regulating the passing of water to xylem.

- 2 A) 1. c 2. b
 3. b 4. c
 B) Answer by yourself.

- 3 A) 1. c 2. e 3. a 4. a
 B) 1. Plant can't get rid of excess water and water can't rise up to all parts of the plant.
 2. Root hairs can't absorb the water.

- 4 A) 1. (✓) 2. (✓) 3. (✓) 4. (✓)
 B) 1. In order to allow some types of salts that the cell needs to pass.
 2. To allow water to pass from the soil to the root by osmosis feature.

Model Answers

GEM General Tests on Unit 4

P. 55

Test 1

- 1 A) 1. photosynthesis 2. transpiration
3. pith 4. stomata
B) 1. Because the plant carries out transpiration process.
2. To control opening and closing the stoma.
- 2 A) 1. oxygen 2. shoot
3. sunlight - CO₂ - water - mineral salts
B) Answer by yourself.
- 3 A) 1. d 2. c 3. b 4. d
B) Pith → xylem → endodermis → cortex → epidermis.
- 4 A) 1. leaf 2. photosynthesis
3. guard 4. transpiration
B) 1. Process by which the plant allows some salts to pass through according to the plant's need.
2. Transmission of water from high concentration of water to low concentration of water through a semi-permeable membrane.

Test 2

- 1 A) 1. b 2. c 3. a 4. b
B) Answer by yourself.
- 2 A) 1. guard cell
2. water, water vapor
3. photosynthesis process
4. nitrogen - calcium - magnesium.
B) 1. To make photosynthesis process.
2. To allow the permeability of some salts and not allow the passing of others according to the needs of the plant.
- 3 A) 1. cortex 2. root hairs
3. two guard cells
B) Fig. (a) open stoma.
Fig. (b) closed stoma.
- 4 A) 1. (X) 2. (✓) 3. (✓) 4. (X)
B) Answer by yourself.

School Exams

on the Second Term

2018-2019

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1 Cairo - Shoubra Educational Directorate

- 1 A) 1. mercury vapor
2. plastic 3. pliers
4. 7 minutes and few seconds
B) 1. water 2. first
3. annular 4. Archimedes
5. guard
- 2 A) 1. (X) 2. (X) 3. (✓) 4. (✓) 5. (✓)
B)
- | P.O.C. | Solar eclipse | Lunar eclipse |
|--------------------|---|---|
| Reason | Moon comes between the Earth and the Sun on one straight line | Earth comes between the moon and the sun on one straight line |
| Time of occurrence | at daytime | at night |
- C) 1. effort force x its arm = resistance x its arm
effort force x 2 = 20 x 6
 \therefore effort force = $\frac{20 \times 6}{2} = 60 \text{ N}$
2. The lever doesn't conserve effort, because the effort force is larger than the resistance force.
- 3 A) 1. tungsten - melting point
2. coal holder - ice holder
3. solar - moon
B) 1. pick up very small objects.
2. connect the fluorescent lamp to the electricity.
3. Help the plant to lose most of the excess water that reaches leaves.
C) a. closed b. series connection
- 4 A) 1. second class lever 2. electric burn
3. effort force 4. total solar eclipse
B) 1. Because, the sun emits harmful rays (UV - IR) that may cause blindness.
2. Because, it causes electric overload that heats up wires leading to electric fires.
3. To allow the water to transmit from the soil (high concentration of water) to root hairs (less concentration of water) by the osmosis feature.
C) 1. This causes electric shock.
2. Annular solar eclipse occurs.

Model Answers

2 Cairo - Educational Zone - Official Language Schools

- 1 A) 1. third - first
2. third class lever - second class lever
3. tungsten - melting point
4. electricity - human body
5. partial solar eclipse - moon
B) 1. To connect the lamp to the electric circuit.
2. Because, it causes electric overload that heats up wires leading to fires.
3. To get rid of excess water of the plant through transpiration process.

- 2 A) 1. lever 2. first class lever
3. electric burn 4. total lunar eclipse
5. parallel 6. Second class lever
B) effort force \times its arm = resistance \times its arm
 $100 \times 25 = 500 \times \text{its arm}$
 $\therefore \text{resistance arm} = \frac{100 \times 25}{500} = 5 \text{ cm}$

- 3 A) 1. Fulcrum 2. argon
3. Increasing force
4. Iron 5. guard
B) 1. It protects the filament from burning and increases its lifetime.
2. It prevents air from reaching the filament to protect it from burning.
3. It fixes the plant in the soil.

- 4 A) 1. (X) 2. (X) 3. (✓) 4. (X)
5. (✓) 6. (✓)
B) 1. The light intensity of the lamps will not be affected by increasing the number of the connected lamps.
2. The filament will burn.
3. The moon light turns to be faint without being eclipsed.

3 Cairo - El Sherouq Zone - Mena Language School

- 1 A) 1. third class lever
2. electric lamp 3. electric burn
4. solar eclipse 5. photosynthesis
B) effort force \times its arm = resistance \times its arm
 $200 \times 50 = 1000 \times \text{its arm}$
 $\therefore \text{resistance arm} = \frac{200 \times 50}{1000} = 10 \text{ cm}$

- 2 A) 1. Seasaw - pliers
2. effort force \times its arm = resistance \times its arm
3. argon 4. copper - iron
B) Answer by yourself.

- 3 A) 1. To connect the lamp to the electric circuit.
2. To avoid occurrence of electric fires.
B) 1. light 2. two
3. argon 4. parallel
5. root hair

- 4 A) 1. (X) 2. (✓) 3. (✓) 4. (X)
B) 1. The filament will melt at high temperatures.
2. The filament will burn.

4 Giza - Dokki Educational Directorate

- 1 A) 1. Nutcracker 2. plastic
3. middle 4. electric fire
B) a. effort force \times its arm = resistance \times its arm
 $10 \times 10 = 20 \times \text{its arm}$
 $\therefore \text{resistance arm} = \frac{10 \times 10}{20} = 5 \text{ cm}$
b. The lever saves effort, because the force arm is longer than resistance arm.
C) 1. The moon light turns to be faint without being eclipsed.
2. The filament will melt.
3. The root hairs can't control passing of some types of salts according to the plant's need.

- 2 A) 1. first - second 2. parallel
3. electricity 4. moon - earth
B) 1. battery 2. lamp
3. electric wires 4. switch
C) Answer by yourself.

- 3 A) 1. Because, water is a good conductor of electricity.
2. To control opening and closing the electric circuit.
3. Because, the sun emits harmful rays to the eye that may cause blindness.
4. Because, in the first levers only, the effort arm may be equal to resistance arm.
B) 1. glass bulb 2. argon gas
3. filament 4. base of light bulb

- 4 A) 1. fulcrum 2. penumbra
3. electric insulators
4. series connection
B) 1. electric fire 2. argon
3. solar 4. copper
C) Answer by yourself.

5 Giza - Giza Educational Administration - Orman Language School

- 1 A) 1. second - first
2. mercury vapor
3. electricity 4. moon
5. stomata

Model Answers

- B)1. The effort force is more than the resistance force and this lever doesn't conserve effort.
2. The light intensity of lamps will not be affected.

- 2 1. mercury vapor 2. sweet holder
3. third 4. tungsten
5. shoot system

- 3 A)1. electric lamp 2. electric fires 3. total lunar eclipse
4. fulcrum 5. epidermis
B) Answer by yourself.

- 4 A)1. third 2. total
3. first
B)1. (A) series
(B) parallel
2. Answer by yourself.

6 Giza - Abo El-Nomrous Educational Zone - Ahmos Language School

- 1 A)1. glass bulb - the base of light bulb
2. don't play with electric connection - don't insert metallic object in socket
3. moon - earth 4. moon
5. photosynthesis
B) 1. 2nd class lever
2. 3rd class lever
3. 2nd class lever
4. 3rd class lever
5. 2nd class lever
6. 2nd class lever

- 2 A) 1. electric lamp 2. electric fires 3. solar eclipse
B) 1. electric conductor
2. series 3. second
4. dark 5. vapor

- 3 A) 1. total lunar eclipse
2. a good conductor of electricity
3. mercury vapor
4. penumbra
B)1. Because, the effort arm is always longer than the resistance arm, so the effort force is always smaller than resistance force.
2. Because, the sun emits harmful rays to the eye that may cause blindness.
3. To allow the root hair to control the passing of some types of salts according to the plant's need.

- 4 A) Answer by yourself.
B) 1. c 2.a 3.b

C)

Osmosis feature	Selective permeability
It is the transmission of water molecules through semi-permeable membrane from an area with high concentration of water to area of low concentration.	It is a process by which the cell membrane of root hair allows some types of salts to pass according to the plant's need.

7 Giza - Boulak El-Dakrou Administration - Dar El-Hanan Language School

- 1 A)1. tungsten - melting point
2. electric burn 3. partial lunar eclipse
4. epidermis - cytoplasm
B)1. Because, the sun emits harmful rays to the eye that may cause blindness.
2. To protect the filament from burning so the lifetime of the filament increases.

- 2 A) 1. lever 2. third class lever
3. parallel
4. total solar eclipse

- B)1. Some of them conserve effort
2. Allow the plant to get rid of excess water through transpiration process.

- 3 A) Answer by yourself
B) 1. light 2. copper
3. umbra 4. carbon dioxide

- 4 A)

P.O.C.	2 nd class levers	3 rd class levers
Definition	They are levers that have the resistance force between effort force and fulcrum.	They are levers that have the effort force between the resistance force and fulcrum.
Example	Nutcracker	Hockey bat

- B) 1. The filament will burn.
2. This causes electric shock.

8 Alexandria - Al-Montazah Directorate - El-Rahman Language School

- 1 A)1. electric current 2. third class lever 3. penumbra
4. series connection 5. force arm
6. electric circuit
B)1. To prevent turning off all the lamps of the house when one lamp is damaged.
2. Because, the Earth has a great size relative to the moon.
3. Because, it has fulcrum between the effort force and resistance.

Model Answers

- 2 A) 1. The effort force will equal the resistance force and the lever doesn't conserve effort.

2. Partial lunar eclipse occurs.

3. Filament will melt.

B) Answer by yourself.

- 3 1. argon gas - mercury vapor
2. 7 min and fourty seconds - 2 hours
3. electric shock - electric fires
4. rigid - fulcrum 5. Second - first
6. spiral - two side nails

- 4 A) 1. water 2. electric fire
3. red 4. Second class
5. Switch 6. transpiration
B) It is astronomical phenomenon which occurs when the Earth, the moon and the sun are nearly on one straight line with moon in the middle.
C) 1. filament 2. glass bulb
3. base 4. piece of lead
5. copper wires 6. argon gas

9 Alexandria - Al-Montazah Directorate

- 1 A) 1. Third - Second 2. Series - parallel
3. glass bulb - base of light bulb
4. moon - Earth 5. Osmosis feature
B) Answer by yourself.

- 2 A) 1. increase 2. middle
3. Archimedes 4. fulcrum
B) 1. Because, it has high melting point.
2. Because, sometimes in the first class levers, the effort arm is longer than the resistance arm.
3. To control opening and closing the stoma.

- 3 A) 1. electric lamp 2. manual broom
3. total lunar eclipse
4. electric fire
B) 1. Third 2. No
3. Because, the effort arm is always shorter than the resistance arm, so the effort force is always larger than resistance.

- 4 A) 1. mercury vapor 2. seven minutes
3. second 4. decreases
5. selective permeability
B) Answer by yourself.

10 Dakahlia - Dakahlia Educational Directorate

- 1 A) 1. electric burn 2. solar eclipse
3. newton 4. good conductors
5. parallel 6. first class lever
7. transpiration

B) Answer by yourself.

- C) 1. increasing force
2. avoiding dangers

- 2 A) 1. middle 2. argon
3. manual broom
4. shock 5. (a),(b),(c)
6. rubber 7. endodermis
B) Answer by yourself.

- 3 A) 1. Earth - moon - sun
2. tungsten - high melting
3. series 4. umbra
5. good conductor
B) 1. The moon tends to be faint without being eclipsed.
2. The other lamps in the circuit will not be affected.
3. Answer by yourself.

- 4 A) 1. (X) 2. (X) 3. (X) 4. (✓)
5. (✓) 6. (X)
B) 1. base of the bulb
2. copper wires
3. glass bulb 4. argon gas
C) 1. battery 2. lamp
3. switch 4. electric wires

11 Kafr El-Sheikh - Directorate of Education

- 1 A) 1. 2 2. tungsten
3. first 4. during day
5. transpiration
B) 1. (a) open electric circuit
(B) closed electric circuit
2. The electric current will not flow through wires.

- 2 A) 1. b 2. c
3. d 4. a
B) 1. electric conductors
2. indirect injuries
3. stomata

- 3 A) 1. To protect the filament from burning and increases its lifetime.
2. Because, in second class lever the force arm is always longer than the resistance arm so the force is always less than the resistance.
B) 1. parallel 2. lunar
3. becomes faint
4. argon 5. carbon dioxide

- 4 A) 1. (X) 2. (✓) 3. (X) 4. (✓)
B) 1. earth - red
2. selective permeability

Model Answers

12 Beheira - Science Supervision

- 1 A) 1. second class
2. fulcrum 3. series
4. partial lunar
- B) 1. Because the sun emits harmful rays as (UV - IR) that cause blindness.
2. Because they are used in:
• Increasing the speed.
• Increasing the distance.
• Avoiding dangers.
• Preserving accuracy in performance.

- 2 A) 1. Resistance arm.
2. First class levers.
3. Electric burns.
4. Solar eclipse.
- B) 1. The lever does not save effort.
2. Electric shock will occur.

- 3 A) 1. argon 2. middle
3. tungsten 4. first
5. selective permeability
- B) 1. It prevents air from reaching the filament to protect it from burning.
2. It always saves effort.

- 4 A) 1. year 2. light
3. copper 4. 7 minutes
5. transpiration
- B) Answer by yourself.

13 Beheira - Kafr El-Dawar Educational Zone - El-Safwa Private School

- 1 A) 1. less 2. electric shock
3. total lunar eclipse
4. epidermis layer
- B) force x its arm = resistance x its arm
 $200 \times 2 = R \times 4$
 $R = \frac{200 \times 2}{4} = 100 \text{ N}$
 $F > R \therefore$ It doesn't conserve effort.

- 2 A) 1. solar eclipse 2. resistance arm
3. electric burns 4. partial lunar eclipse
5. transpiration process
- B) 1. You will get an electric shock.
2. The lever becomes unbalanced.

- 3 A) 1 - c) full moon
2 - c) wheel barrow
3 - a) twice per year
4 - c) Archimedes
- B) Answer by yourself.

- 4 A) 1. Glass bulb.

Function: It prevents air from reaching the filament to protect it from burning.

2. Tungsten filament.

Function: It is heated till it glows and emits light when electric current passes through the filament.

3. The base of lamp.

Function: • It carries the light bulb in an upright position.

• It connects the light bulb to the electric circuit.

- B) 1. Answer by yourself.

2. To avoid electric fires.

3. Because the sun emits harmful rays as (UV - IR) that cause blindness.

14 Damietta - Directorate of Education - Official Language Schools

- 1 A) 1. Argon - mercury vapor.
2. effort force - resistance force.
3. partial lunar eclipse, annular solar eclipse.
4. tungsten, melting point
- B) 1. The fire won't be put out and it might increase.
2. Light intensity will decrease by increasing the number of lamps and all the lamps will be turned off if one lamp is burned.

- 2 A) 1. electric burns
2. electric conductors
3. total solar eclipse
4. series connection
- B) 1. simple electric circuit
2. 1. electric wire 2. switch (key)
3. battery 4. electric lamp
3. closed.

- 3 A) 1 - b) the wheel barrow
2 - a) longer than
3 - a) first.
4 - c) annular
- B) 1. To connect the lamp with electric circuit.
2. Because the effort force is always greater than resistance force.
3. To allow water to transmit from the soil (high concentration of water) to root hairs (less concentration of water) by the osmosis feature.

- 4 A) Answer by yourself.

- B) 1. per year 2. partial
3. sand 4. second
5. semi permeable
- C) Answer by yourself.

Model Answers

15 Sharkia - Sharkia Educational Directorate

1. fulcrum 2. third class levers
3. second class levers.
4. electric lamp
5. electric conductors
6. lunar eclipse 7. stomata

- 2 A) 1. first 2. middle
3. decreases
B) 1. Because it has a high melting point that prevents the filament from melting at high temperature.
2. Because water is a good conductor of electricity, so it will increase the fire.
3. Because the sun emits harmful rays as (UV - IR) that cause blindness.

- 3 A) 1. force, distance 2. battery, wire
3. wood, plastic
4. total lunar eclipse, partial lunar eclipse
B) 1. Effort force \times its arm =
the resistance force \times its arm
2. $200 \times 50 = 1000 \times R \text{ arm}$
 $R \text{ arm} = \frac{200 \times 50}{1000} = 10 \text{ cm}$

- 4 1. first class levers
2. third class levers
3. argon gas 4. parallel
5. electric shock 6. red
7. carbon dioxide

16 Port Said - Directorate of Education - Inspectorate of Science

- 1 1. second 2. argon
3. moon, earth 4. parallel
5. third 6. two guard cells

- 2 A) 1. (c) tungsten 2. (c) scissors
3. (c) copper 4. (a) first
B) 1. c 2. a 3. b 4. d

- 3 A) 1. partial lunar eclipse
2. electric fires 3. lever
B) 1. solar 2. series
3. longer

- 4 A) 1. Because water is a good conductor of electricity, so it will increase the fire.

2. Due to the osmosis feature which allows the transmission of water through a semi-permeable membrane from an area of high concentration of water to a lower one.
B) Total lunar eclipse will occur.
C) Effort force \times its arm =
the resistance force \times its arm
 $200 \times 50 = 1000 \times R \text{ arm}$
 $R \text{ arm} = \frac{200 \times 50}{1000} = 10 \text{ cm}$
D) 1. lamp 2. electric wire
3. switch (key) 4. battery

17 South Sinai - Science Supervision

- 1 A) 1. effort force, resistance force
2. wood, plastic
3. battery
4. moon, earth
5. electric burns
6. third class
B) 1. Because water is a good conductor of electricity, so it will increase the fire.
2. Because they are used in:
• Increasing the speed.
• Increasing the distance.
• Avoiding dangers.
• Preserving accuracy in performance.
3. Because it helps the plant to get rid of excess water by transpiration process

- 2 A) 1. wheelbarrow.
2. remains as it is
3. iron
4. crow bar
5. light
6. less than
B) 1. Don't use one socket for many devices at the same time.
2. Don't insert metal objects in electric sockets.
3. Don't play with electric connections
C) 1. sun 2. moon
3. umbra (full shadow)
4. penumbra (partial shadow)

- 3 A) 1. (X) 2. (X) 3. (✓)
4. (✓) 5. (X) 6. (X)

Model Answers

B)

Total lunar eclipse	Partial lunar eclipse
It is the lunar eclipse which happens when the whole moon falls in the shadow area (umbra) of the earth	It is the lunar eclipse which happens when a part of the moon lies in the shadow (umbra) area of earth and the other part lies in the semi-shadow (penumbra) area of the earth
We can't see the moon completely.	We can't see a part of the moon.

C) 1. e 2. c 3. d 4. a

- 4 A) 1. second class levers
2. the tungsten filament
3. series connection
4. fulcrum
5. electric shock
6. first class levers

B) $F \times F \text{ arm} = R \times R \text{ arm}$
 $48 \times 4 = R \times 6$

Resistance = $\frac{48 \times 4}{6} = 32 \text{ N}$

- C) 1. The light intensity will decrease by increasing the number of lamps and if one lamp is burned all the lamps will be turned off
2. The moon will be faint without being eclipsed.
3. This will lead to burning of the filament.
4. This will lead to electric fires.

18 Fayoum - Science Supervision

- 1 A) 1. (a) first. 2. (b) argon.
3. (b) moon, the earth, the sun.
4. (b) second. 5. (c) semipermeable.

B) Effort force x its arm = Resistance force x its arm

Resistance arm = $\frac{100 \times 200}{500} = 40 \text{ cm}$

- 2 A) 1. series connection
2. Total lunar eclipse
3. Electric burns 4. Fulcrum

- B) 1. Because it has a high melting point that prevents the filament from melting at high temperature.
2. Because the sun emits harmful rays as (UV - IR).

3. Due to the osmosis feature which allows the transmission of water from an area of high concentration of water to an area of low concentration of water.

- 3 A) 1. (✓) 2. (X) 3. (✓) 4. (X)

- B) 1. Second class lever
2. First class lever 3. Third class lever

- 4 A) 1. Iron - copper
2. Earth - partial
3. phosphoric - mercury
4. epidermis

- B) 1. This is a third class lever that doesn't save effort.
2. This might lead to electric fires.
3. The tungsten filament will burn.

19 Assuit - Directorate of Education

- 1 A) 1. First class lever
2. Moon, earth
3. Conductors, insulators
4. Third

- B) Pith - Xylem - Endodermis - Cortex - Epidermis

- 2 A) 1. (✓) 2. (X) 3. (X) 4. (X)
5. (✓)

- B) 1. The fire won't be put out and it might increase.
2. Light intensity decreases as the number of lamps increase and all the lamps will be turned off if one lamp is burned

- 3 A) 1. parallel connection
2. partial lunar eclipse
3. Electric burns 4. Third class levers

- B) 1. Because the sun emits harmful rays as (UV - IR).
2. Because sometimes the arm of force is longer than the arm of the resistance.

- 4 A) 1. light bulb
2. (1) Tungsten filament
(2) Thin glass bulb
(3) The base of lamp

B) $F \times F \text{ arm} = R \times R \text{ arm}$
 $50 \times 20 = R \times 5$
 Resistance = $\frac{50 \times 20}{5} = 200 \text{ N}$

Model Answers

20 Qena - Qena Educational Administration

- 1 A) 1. Flow 2. Second
3. decreases 4. third
5. Stomata
- B) 1. It is a rigid bar that rotates around a fixed point called fulcrum and is affected by effort force and resistance force.
2. It is the astronomical phenomenon which occurs when Earth, Moon and Sun are nearly on one straight line with moon in the middle.

- 2 A) 1. two hours 2. argon
3. total and partial 4. tungsten
5. Xylem vessels
- B) 1. To avoid occurrence of electric fires.
2. Because sometimes in the 1st class levers the effort arm is longer than resistance arm.

- 3 1. (X) 2. (✓) 3. (✓)
4. (X) 5. (✓) 6. (X) 7. (✓)

- 4 A) 1. electric shock 2. Fluorescent lamp
B) effort force x its arm = resistance x its arm
 $30 \times 20 = 20 \times \text{its arm}$
 $\therefore \text{Resistance arm} = \frac{30 \times 20}{20} = 30 \text{ cm}$
C) Answer by yourself.

21 Qena - Qena Directorate of Education

- 1 A) 1. fulcrum
2. series connection
3. electric burn 4. total lunar eclipse
- B) 1. The fire will increase and could harm the rescuers as water is good conductor of electricity.
2. Answer by yourself.

- 2 A) 1. first - Second 2. electric - light
3. Osmosis
- B) 1. iron 2. tungsten
3. red 4. first

- 3 A) 1. (X) 2. (X) 3. (✓)
4. (X) 5. (X) 6. (✓)
- B) 1. Because, the effort arm is always longer than the resistance arm.
2. To avoid occurrence of electric shock.
3. Answer by yourself.

- 4 A) effort force x its arm = resistance x its arm
 $100 \times 25 = 500 \times \text{its arm}$

$$\therefore \text{Resistance arm} = \frac{100 \times 25}{500} = 5 \text{ cm}$$

- B) 1. battery 2. switch
3. electric wire

22 Sohag - Akhmeem Educational Management

- 1 1. increasing force - increasing speed
2. force arm = resistance arm
3. tungsten - melting point
4. series - parallel 5. partial solar - moon
6. middle

- 2 1. (X) 2. (X) 3. (X)
4. (X) 5. (X) 6. (X)

- 3 A) 1. Fulcrum 2. Second class
3. electric lamp 4. electric burn
5. transpiration
- B) Answer by yourself.

- 4 A) Answer by yourself.
B) 1. The filament will burn.
2. The fire will increase and could harm the rescuers.
3. The lunar eclipse occurs.
4. Water can't be transported from soil to the root hair.

23 Sohag - Sohag Educational Zone

- 1 A) 1. effort arm - resistance arm
2. strength of electricity - time taken by electricity through human body.
3. mercury vapor - phosphoric
4. stomata
- B) 1. Because, the force arm is always longer than the resistance arm.
2. To prevent turning off all the lamps of the house when one lamp is damaged.

- 2 A) 1. Lever 2. electric conductors
3. electric burn 4. electric lamp
5. 3rd class lever
- B) Answer by yourself

- 3 A) 1. moon 2. Sun 3. Earth
B) 1. (✓) 2. (X) 3. (✓) 4. (✓)

- 4 A) Answer by yourself.
B) 1. two hours 2. Solar
3. electric shock

Model Answers

24 Luxor - Luxor Educational Zone

- 1 A) 1. 7 minutes and 40 seconds
2. middle 3. tungsten
4. hockey bat 5. root hairs
B) 1. This causes electric shock.
2. Harm the retina of the eye that may cause blindness

- 2 1. electric - light 2. Series - parallel
3. first - hockey bat 4. moon - earth
5. copper - iron
6. argon - mercury vapor

- 3 A) 1. resistance arm 2. Fulcrum
3. electric burn
4. Annular solar eclipse
B) 1. Because it always has effort arm longer than resistance force.
2. Due to the refraction of some infrared rays that are not absorbed by earth's atmosphere.

- 4 A) 1. series 2. electric fire
3. lunar 4. filament
5. leave
B) effort force x its arm = resistance x its arm
 $50 \times 20 = \text{resistance} \times 5$
 $\therefore \text{Resistance force} = \frac{50 \times 20}{5} = 200 \text{ N}$

25 Aswan - Aswan Educational Directorate

- 1 A) 1. first - third 2. argon
3. good conductor of electricity
4. force arm - resistance arm
5. stomata
B) Answer by yourself.

- 2 A) 1. light 2. series
3. vapor
B) 1. Because the sun emits harmful radiations as (UV - IR) that cause blindness.
2. To avoid electric shock.

C) Answer by yourself.

- 3 A) 1. (✓) 2. (X) 3. (✓) 4. (✓)
B) 1. It will melt.
2. The light intensity will decrease by increasing the number of lamps and if one lamp is burned all the lamps will be turned off.

- 4 A) 1. total lunar ellipse
2. electric burns 3. fulcrum
4. electric fires
B) 1. d 2. a
3. b 4. c



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هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى